

**THE ASSOCIATION FOR
MEXICAN CAVE STUDIES**

NEWSLETTER

TRIP REPORTS

Sierra de El Abra and Xilitla Region, S.L.P.

Sótano de Tlamaya, S.L.P.

Nacimiento del Río Sabinas, Tamps.

Caves in Coahuila, Durango, and Chihuahua

OBITUARIES

BIOLOGY OF THE CAVES OF RANCHO DEL CIELO

NOTES ON SOTANO DE TLAMAYA

DEEP CAVES OF THE WESTERN HEMISPHERE

TRIP REPORTS

Persons: GEO-LUCIFUGUS members Dale Chase, Dan Chase, Bob Hosley, Tony Moore, Jim Richards
Date: 19-31 December 1965
Destination: Tamuín, S.L.P.; Xilitla, S.L.P.; Bustamante, N.L.
Reported by: Bob Hosley

This being our first caving venture into the land of the truly great ones, we planned to spend our time seeing some of the outstanding sótanos reported by the AMCS group rather than to hill-hop looking for new ones. At the same time, we tried to keep in mind the territory or territories we would most like to return to on our next visit during the Christmas vacation of 1966. We talked to lots of people, and we learned of sótanos as yet unexplored which we will be checking out later this year.

For a dramatic start, we chose the 503 foot skylight drop in Ventana Jabalí, near Tamuín. Arrangements with the Presidente of Tamuín quickly led us to Lucio Zárate (whom we dubbed Señor Carta Blanca). Lucio was skillful at pulling strings and arranging all things, and secured a guide for us. The climb up the rugged face of the mountain with our 600 feet of nylon proved more time consuming than we had expected, even when constantly goosed by the hostile cacti which were everywhere. We had all planned to both rappel and climb, but as time was running short, Dale alone did both, Tony executed the climb only, and Dan, Jim, and I did the rappel. It was still an exciting introduction to Mexican caving.

From here we planned to go to Los Sabinos and set up camp at the ranch of Sr. Luis Martinez. While we did not succeed in meeting Sr. Martinez, the Presidente of Valles gave us a police escort out to the ranch - a unique experience in itself since the scruffy cavers of GL are more commonly pursued by police than escorted. Through some misunderstanding, we did not find our objective, Sótano del Tigre, but were led by fearful Indians to the deep arroyo containing, at its end, Sótano de la Tinaja. During our first exploration of this cave in the afternoon, we did not appreciate that this was, in fact, Tinaja, and we were not equipped to do the 25 foot drop. We returned enthusiastically the following morning, again waded through the neck-deep and guano-rich pond that blocks the passage, and soon arrived at the drop and the massive flowstone formations beyond. We found the passage above the flowstone which leads to the right and to the 60 foot drop. Beyond this drop, we had the impression that we were in a section of the cave that contained many intricate routes and abundant speleothems. Following the climbs, descents (no rope needed) and curves, we came to a large sandy-floored passage about 9 feet below us, and running in a fairly straight direction. We rigged a cable ladder and descended (the 9 foot drop was not climbable because of an overhang) but did not explore this passage beyond a few hundred feet. We wanted to return to the northwest passage and see the lakes. In this passage, NW of the main "intersection" we were surprised to see a totally different character of cave with almost mahogany-colored formations of rather giant proportions. The passage was

quite large and had a gravel floor which gradually descended, eventually reaching a lake which was lower at this season than when first seen by the AMCS explorers. Mentioned in their report was the abundance of small, blind, pinkish-white fish which were in such numbers that one could easily scoop them up and release them again. They responded readily to surface vibrations. In retrospect, we did not see much of this very extensive cave though perhaps we saw its more interesting features.

Since the description of Sótano de Tlamaya had intrigued us and was to be a high point of our visit, we left the following day for Xilitla and the famed patio of Sr. Modesto Gómez, now an honorary member of the AMCS. Sr. Gómez proudly displayed his AMCS map of the Sótano de Tlamaya and was a gracious host for our several day encampment. On Christmas morning we made our decision to start the descent. Since it was Christmas, the town, and especially the children, turned out in great numbers to watch our operations. Tony, our expert in driving pitons and in rigging ropes and ladders, was first to descend the initial 279 foot drop. Most of our coiled ropes were tossed in next and, finally, the rest of us went down in rapid succession, each carrying an assortment of equipment. The profile and description of this cave published in the Newsletter indicated that the initial 279 foot drop was followed in rapid succession by two drops of 73 and 76 feet. It was somewhat of a surprise to see that this total depth of 475 feet was visible on the rope as a gigantic chamber with smooth light-grey walls which reflected enough light from a single carbide lamp to give a dramatic view of the entire chamber. The remainder of the cave was as challenging and interesting as previous reports had indicated. We reached the 1418 foot level (from the Upper Entrance) before exhausting our rope supply and, apparently, some of our energy as we took a brief nap here and again when we returned to the Big Room. In all it was 27 hours from our entry until the last man was out. A great line of townspeople helped in hauling up the 600 foot rope with all the rope and other equipment tied to the end.

One interesting biological observation was made in this cave although its identification has not been possible. In a shallow pool at the top of the 209 foot drop a small piece of tree bark appeared to be moving counter to the water current. Later, upstream from this, several more of these structures were seen and it was apparent that this was some kind of living thing. It was dark brown, flat, about an inch and a quarter long with a flare at the "head" end and did not appear to have appendages. The "shell" appeared to be mineral rather than chitin and on breaking one open there was a white worm or larva inside. Although its shell case was radically different than anything we have seen, the fact of a worm or larva inside a shell found in the water suggests the order Trichoptera which includes many species of the caddis fly whose life habits are similar to this in the larval stage. The larvae were seen in reasonable numbers far from the stream entrance though quite probably it is trogonenic or accidental as a cave inhabitant.

Our next sótano was Huitzmolotitla on Sr. Gómez's ranch.

A 344 foot drop with a wide opening and ferns and other tropical greenery growing well down its sides. There were thousands of birds which lived within the extensive cave leading from the pit, and we were fortunate in remaining at the pit until nearly sundown when these birds swooped down out of the forest into the pit in group after group, making a great sound of rushing wind with their wings. We did not explore the cave system leading off this pit, but at one point on climb I got off to peer into an opening and could hear thousands of the birds chattering inside. The area of Tlamaya appears to be a lush semi-tropical paradise and talking to the local people suggested that there are many sótanos in the general area, some of which have now been explored by others.

Termination our trip was a visit to Gruta del Palmito at Bustamante, N.L., largely because of what we had seen in the way of pictures and heard about the magnificent formations of this cave. It was a worthwhile visit but the heavy vandalism and defacing of the formations was quite a disappointment.

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Persons: Dennis Barret, Robert Burnett, John Fish, Charles Jennings, Richard Smith
 Date: 29 January-1 February 1966
 Destination: Sótano de Tlamaya
 Reported by: Robert Burnett

After a long, hot, tiring, miserable drive we arrived at Rancho de Huitzmolotitla just before noon on Saturday, 29 January. Being very tired, we decided to take a nap on the patio for about four hours; and while doing so another group arrived, set up camp, and went to sleep, also. The new arrivals included Ed Alexander, Chip Carney, Don Erickson, and Bill Johnston. About six o'clock, while the others were still asleep, our group got up and headed on down to the cave. Going in were John Fish, Charles Jennings, Richard Smith, and myself. Progress was made to the Big Room where Richard decided not to continue and after some discussion Charles and John decided to do the same, which left me alone. As luck would have it, Ed Alexander caught up with us about this time and he and I continued on toward the back of the cave to finish the map. The others planned to be back in the cave in 12 hours in order to help pull out the equipment. A couple of hours later Ed and I were at the end of the last surveyed section of the cave, 1418 feet below the entrance. At this point was a large pool which was unavoidable so in we went, getting wet for the first time. Past this pool the walls became covered with about four inches of mud and there were many chimneys and traverses to make. Eight hundred feet of passage later we were standing at the top of an 8 foot drop which Ed hadn't remembered being there on the last trip into the cave. (See AMCS Newsletter Volume I, Number 9, page 86.) After another hundred feet Ed was lost. What had been a lake of from 6 to 15 feet deep was now just a mud passage. This allowed us to map about 300 feet further than we had expected. At this last point reached we were disappointed to find that this large, deep cave system ended in a small, insignificant mud siphon. This terminal siphon is 1488 feet below the Upper Entrance, which makes Sótano

de Tlamaya the deepest surveyed cave in North America. We completed the last few stations for the survey then headed for the entrance with all due haste. Everything went fine until we reached the Big Room where we found a very large amount of equipment. This led us to believe that some of the group was in the upstream passage, so we laid down and slept for an hour. Noone had returned by the time we awoke so we decided to head on out of the cave. All ropes were left in place for the people we thought were still in the cave. Arriving at the Entrance Room, 475 feet below the entrance, we were quite surprise to find no rope rigged at the drop. We waited there about five to ten minutes, which seemed like forever, when we heard the voice of John Fish filtering down from above. He brought with him the rope which had been used for hauling up equipment and told us that there wasn't anyone else in the cave. We continued on out, arriving at the surface Sunday evening after spending just over one day in the cave. The next morning John and I went back into the cave as far as the Big Room to recover the equipment that had been left. Also, after observing how trashed up the cave was getting, we spent several hours cleaning up the garbage that thoughtless people had been too lazy to carry out or even bury. Here I would like to make a plea. Would all people who go to Tlamaya and any other caves in Mexico please clean up after themselves. There are several hundred feet of rope scattered throughout the cave plus batteries, carbide and tin cans. Tlamaya and other Mexican caves are going the route of so many caves in the United States. Please clean up.

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Persons: Bernie Duck, Tom Felder, Jim and Barbara Hershberger,
Maudanne Russell, Merydith Turner

Date: 29-31 January 1966

Destination: Nacimiento del Rio Sabinas and Sótano de la Tinaja
Reported by: Barbara Hershberger

We left Austin about 5 PM and drove to Ciudad Victoria, arriving there at 7 AM the next morning. Here we picked up Merydith and continued on south. We turned off the highway at El Encino and drove west to the bridge over the Rio Sabinas. Our purpose on this trip was to find the Nacimiento del Rio Sabinas and look for any caves in the area. From the bridge we got a ride on a lumber truck going northwest. We rode on it for about 12 km. then walked back the way we came until we came to the village of El Ranchito. From here we left the trail and walked across the fields until we came to a small stream. We asked a villager where the Nacimiento was and he led us to it. The water comes out of the base of a large cliff which ends about three feet below the surface of the water. It is obviously a cave but would require diving gear to enter. The pool is about 80 feet in diameter and 60 feet deep. The immediate area is more tropical than the surrounding bamboo and banana tree forest. Wild oranges and tropical butterflies were common as well as the usual snakes and insects. The pool is considered sacred to the villagers as far as we could ascertain and they refused to go near there except on certain occasions. During our walk back to the car we asked about other caves and the general idea was

that there were many on top of the mountains to the west, but none in the valley where we were. These caves which they indicated were to the west are probably those of Rancho del Cielo and La Joya de Salas.

We left the area and continued on south again to Cd. Mante where we camped at the Nacimiento del Rio Mante. The next morning we drove on to Cd. Valles where we got the key from the owner of Sótano de la Tinaja, Sr. Luis Martinez, and headed on out to the cave. There we spent the day in the cave, exploring sections of the cave that were already surveyed, not doing any additional surveying. That night was spent in the entrance room. In the morning the key was returned and we went to Cd. Mante, swam at the Nacimiento, then drove straight back to Austin.

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Persons: Bill Bell and James Reddell
 Date: 20 February--2 March 1966
 Destination: Caves in Coahuila, Durango, and Chihuahua
 Reported by: James Reddell

Sunday, 20 February After the usual delays we finally got the Land Rover completely packed and about 5:00 PM left Austin. We arrived in Piedras Negras without any difficulty, made it through Customs with a minimum of trouble, and drove to a spot along the highway between Nueva Rosita and Monclova where we slept for a few hours.

Monday, 21 February The next morning we drove into Monclova and then headed east on the main road to Candela. Our directions were rather incomplete so only after much searching did we finally reach the Rancho de Las Animas where we obtained directions to the Cueva (or Mina as it is usually called) de Las Animas. The ranch is located about 15 miles off the Monclova-Candela road, the turnoff being about 40 kilometers east of Monclova. From the ranch it was an easy matter to find the cave a few kilometers distant and easily visible by reason of the cleared area and piles of rock from the mining operations. The natural entrance to the cave lies a few hundred feet above the bed of a small mountain and is an impressive sink about 30 feet high, 15 feet wide, and sloping steeply down for about 30 feet at which point it becomes too steep to climb for an additional 30 feet and then drops vertically for about 40 feet into a huge room. Rotten ladders lead part way down the drop, but we could find no sign of them at the bottom so we presumed they have been taken away or are completely rotten now. The room at the bottom is about 150 feet in diameter and 60-80 feet high with an irregular floor of breakdown and guano. Along the sides of the room small dead-end passages slope up, some leading into domes with live formations and moist silt. In general, however, the cave is dry and dusty. A colony of swallows inhabit the entrance room and bats inhabit a second room reached by a sloping passage to the left of the entrance room. This second room is about 100 feet in diameter and 50 feet high. A tunnel has been drilled through solid limestone into the entrance room near the floor

and is about 200 feet long. It is possible to walk through this tunnel and enter the cave without using rope. The second tunnel was too high on the hillside and was abandoned after a short distance. After making intensive collections in the cave we retired to the mouth of the tunnel where rain decided us to camp. The suction of air drawn through the tunnel and into the cave and out the natural entrance made it an ideal camping place. After supper we went to sleep in considerable comfort.

Tuesday, 22 February Rain blowing in on us and an icy blast of air drove us out of our sleeping bags early. Throwing our gear into the Land Rover we set off post-haste to try to get out of the "road" to the main road before we became permanent inhabitants of the area. Without too much trouble we made it to within a few miles of the Candela road when a deep "dry" gully containing a foot of water stopped us cold. For a few hours we proceeded to dig in the freezing rain, mud, and water, apply chins to the jacked-up vehicle, cut thorn bushes and dig rocks out of the ground in an attempt to free the invincible Land Rover. Finally with a great effort it broke free and we were back on our way, feeling like a trip to a typical Central Texas cave. When we finally reached Monclova it was too late to go to any other caves in the area so we headed south to Saltillo in an attempt to see a cave on the highway we had heard about which could be seen easily. As it turned out fog and rain kept visibility to near zero so we drove on to Saltillo and then west of La Cuchilla, about 50 kilometers east of Torreon. Here we spent the night on the desert under the stars.

Wednesday, 23 February Since I needed additional crickets from a small cave in the hills by La Cuchilla we spent an hour collecting in Cueva de Empalme and Cueva de los Grillos, two small caves of only passing interest. From here we drove west to Torreon, hoping to find Cueva de la España which was reported to be near Torreon in Coahuila. The next few hours were of the most hectic sort, with us driving back and forth along the main highway and various other roads seeking anyone who knew where either Nazareno or Picardias (the key towns in our directions) were. Finally we got directions of a sort and set out, eventually arriving via trails, dim dirt roads, and worse to a main Torreon-Picardias highway in the state of Durango. Cursing direction-givers, we were then directed to the Cueva del Guano (the local name of Cueva de la España) and set out. Thinking we had the cave located we drove via the highway to Torreon for a good supper. We then returned to Picardias for a good night of sleep.

Thursday, 24 February Early in the morning we set out up the canyon in which we supposed Cueva del Guano lay. After a long climb we reached the shelter we had supposed was the cave. From here we continued a long, difficult climb through lechiguilla and up vertical pitches until we had essentially reached the top of the mountain, about 2000 feet above the Land Rover. Abandoning the whole thing as a bad deal we crashed our way back down to the foot of the mountain and were ready to give the whole thing up when we saw an old man who upon hearing what we wanted pointed to the next canyon over. Arriving there we followed the old mining road as far as it could be driven on

before it became washed out and then walked the hundred yards to the mouth of the cave. The entrance is about 70 feet wide and 35 feet high with a breakdown slope leading up into the first "room" which is a passage about 200 feet long, 30 feet wide, and 20 feet high. This room is floored with several feet of extremely dry and chokingly dusty guano. At the back of this room the main passage continues on into a reported second room, but a side passage slopes down to the left and into several large moist rooms, some inhabited by small bat colonies. The largest of the rooms explored was about 40 feet high and 75 feet in diameter. Lacking equipment, we did not enter a 30 foot deep pit. Also left unchecked were several prominent passages. Collecting proved exceptionally good, with the discovery of a large population of the extremely rare arachnid order, Ricinulei, which is represented by only a few species in the world. Leaving the cave, we drove down to Picardias where we talked to an ex-guano miner who informed us that the cave was mined until 1961 at which time a lung disease (presumably histoplasmosis) killed one miner and sent several others to the hospital, forcing the closure of the mine. Feeling a little less happy about our finds and with slight chest pains we drove on to Salaices, Chihuahua, where we spent the night at the mouth of Cueva del Diablo.

Friday, 25 February This morning we briefly visited Cueva del Diablo (see AMCS Newsletter, vol. I, no. 7, p. 67) in search of cirolanid isopods. Having no luck, we spent only a short time in the cave and then drove on north to Chihuahua and then west to the Indian city of Cuauhtemoc, where we spent the night in a hotel.

Saturday, 26 February From Ciudad Cuauhtemoc we drove on west to La Junta and then northwest to Santo Tomás where the Shell map of Mexico showed a Santo Tomás Caverns. The first man we talked to pointed us on down the road where in seven miles we should find this cave, which is most commonly known as El Sócavon. Seven miles down the road we found nothing but fields so we began asking farmers about the cave. One would point down the road and another back, so for quite a while we drove back and forth down the dirt road. Eventually we found the right road and after a few miles arrived at a low limestone hill lying immediately at the base of a long line of vertical or near vertical volcanic cliffs. This hill proved to be of considerable interest because of the karst development on it. Almost everywhere were sinks, fissures, lapiez, and towers. Unfortunately there were so many grode-holes that we could find none which we thought deserved the honor of being so well known. Finally we found a guide who took us a few feet from where we had stopped and showed us the Sócavon, which was a snow-floored sink with a narrow crevice at one end. Chimneying down the crevice led us in turn to a succession of narrow crevices, small dusty rooms, blocked domes, and general unpromising passage, but with names everywhere. Considering everything and the icy cavern, we decided we didn't care too much for the cave so left. We checked several other small caves and sinks in the same area but all were blocked, so we decided to set out on our main goal of the trip, Batopilas, in the Barranca del Rio Batopilas south of Creel. The return to La Junta and the drive south of there into the mountains was

with no difficulty, and night found us camping beside a beautiful mountain stream below pines and with snow and ice on the ground. Although the road to this point had included driving down creeks and through railroad culverts it hadn't been too bad.

Sunday, 27 February After a fine night we awoke and headed on towards Creel. Our road deteriorated considerably and we found ourselves using four-wheel drive on the steeper slopes and finally driving through a rocky creek bottom. Just beyond the creek we came into a small village lined with cliffs with large shelters being used as barns. From here we got lost and spent a few extra hours of driving through creek crossings and similar situations before we arrived in Creel. From here we drove on south towards Batopilas hoping to reach it by night, even though it was 120 kilometers away. After many exhausting but exhilarating hours of driving through spectacular scenery we took a wrong turn and wasted over an hour of daylight before we got back on the right road. A broken and dragging emergency brake caused a few tense moments until we found out what was wrong and removed the brake shoes. From here we drove on into the Barranca del Rio Batopilas where fires lit up the hillslopes and the sounds of the drums of the half-civilized Tarahumari Indians made our descent into the several-thousand foot deep canyon an eerie experience. Crossing a bridge over the river we then climbed back up a few hundred feet where the road ended abruptly at a mine. A band of drunken miners informed us there was no road to Batopilas but that it was only a day by horseback away. We also discovered that to reach the famed Barranca del Cobre a hike of more than ten miles down the Rio Urique is necessary. Intensely disappointed we drove back down to the bridge where we slept on hard rock.

Monday, 28 February We spent most of the day collecting on the surface and drove back as far as San Juanita, a lumbering town on the railroad between Creel and La Junta, but finding ourselves very uncertain as to which road to take out of town we spent the night in the hotel there.

Tuesday-Wednesday, 1-2 March From San Juanita we drove straight through to Austin, stopping only to change a flat at Johnson City and to do a little shopping in Ciudad Cuauhtemoc. The return trip was exhausting but pleasant and we arrived in Austin about 11:00 AM Wednesday morning.

Modesto Gómez Saldívar, 1898-1966

Modesto Gómez Saldívar was born on November 4, 1898, in the small town of Alaquines, San Luis Potosí. From here he later moved to the Xilitla, S.L.P. area where he became the owner of El Rancho de Huitzmolotitla. Sr. Gómez lived on the ranch for many years where he raised coffee and oranges. Then, on January 7, 1966 he was killed in an automobile accident while returning from Ciudad Valles. The unfortunate accident occurred at Kilometer Post 440 and afterwards he was taken to Tultepec, México where he was buried by relatives. Since then the ranch has been sold to Ing. Rafael González Cisneros who lives in Mexico City. He has hired Sr. Ismael Larios to operate the ranch.

While living at his ranch near the small village of Tlamaya, Sr. Gómez became very well known and liked throughout the entire Xilitla region. Ever since the first expedition went into the area ten years ago (Bob Mitchell of the University of Texas Biology Department visited the ranch in 1956), Sr. Gómez has extended his complete hospitality to all cavers. He even went so far as to say, "Mi casa es su casa". Without the ranch as a base of operations, the great progress in exploration and mapping of the many sótanos in the area could not have been accomplished. Included among the caves which Sr. Gómez's generosity made the exploration of possible, is Sótano de Tlamaya, the deepest surveyed cave in North America. All spelunkers who were fortunate enough to have had the honor of meeting Sr. Modesto Gómez, will long remember him for his unending kindness and goodwill to all.

Terry Raines

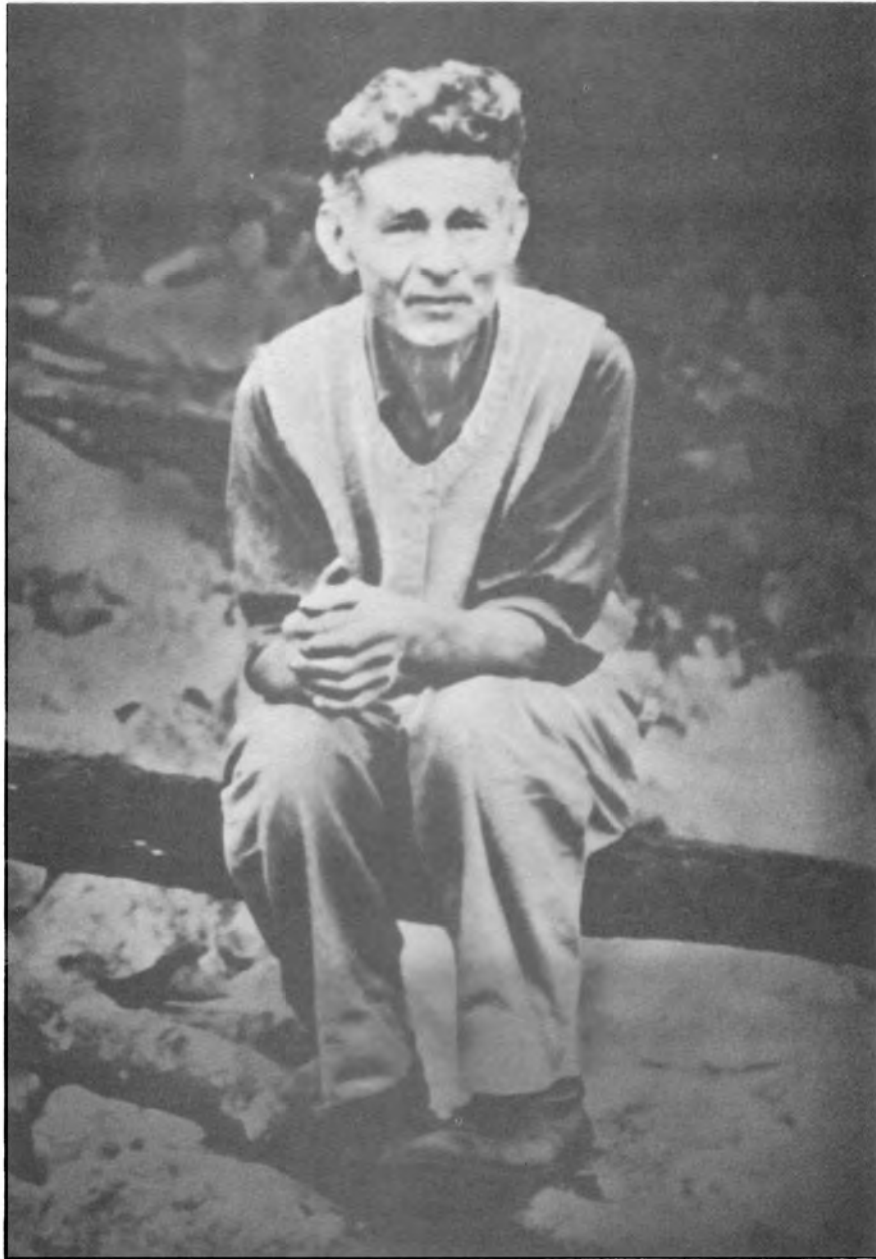
John William Francis Harrison, 1901-1966

Frank Harrison was born in Baysville, Ontario, Canada on June 21, 1901; on January 29, 1966 he was murdered at his home at Rancho del Cielo, northwest of Gomez Farías, Tamaulipas, Mexico. He had lived at Rancho del Cielo for more than twenty years and made it a center for biological research in the northern part of the Sierra Madre Oriental. The area is the last section of Cloud Forest in Mexico and until recently it was virgin forest. As such, it is a unique area and has been the subject of intensive research by biologists and naturalists for many years. This research has been largely the result of Frank Harrison's unceasing interest in helping promote the area and in encouraging biologists to visit the area. His hospitality was famous throughout the area and among naturalists who worked in the area.

Rancho del Cielo is located about eight miles to the northwest of Gomez Farías and is accessible only by foot or by four-wheel drive vehicles. Until two years ago it was quite isolated. At that time a group of Agrarians began to move into the forest area around the small plot of Rancho del Cielo. Frank Harrison was opposed to this because the land could not be properly farmed and the invasions served only to kill off the animal life and generally disturb the area. He protested to the Mexican government and as a result considerable friction had developed between him and the Agrarians. Finally they moved into a small cleared area about a half mile from his house, known as Paul's Place. Further friction developed after his cows broke into their poorly fenced fields and even a generous settlement did not remove hard feelings. On the morning of January 29th two of the Agrarians' group way-laid him in the area between his house and the calf-lot close to the house. He was hit on the side of the head with a club and stabbed three times with a knife. On the morning of the 30th two friends from a nearby lumber camp found his body and reported the murder to the police in Gomez Farías. The house had been ransacked and many guns and other articles stolen. Mr. John Hunter and other friends from Southmost College at Brownsville, Texas, helped to straighten up his affairs and buried him at Rancho del Cielo. Although his long-time associate and worker, Lucas Ramiero, was arrested by the police he was later released. The two men who killed him were apprehended and identified as Federico Lopez and Simon Leal, both members of an extreme leftist group in the Agrarian movement. Before his death Frank had made Southmost College a gift of his property and it is now being developed into a biological research station.

Until June 1964 no cavers had visited the ranch, but at that time David McKenzie, Larry Manire, and I spent about a week there. Although he had no notice of our trip he took us in, fed us, gave us a place to stay, and spent many hours guiding us to remote parts of the forest where we found obscure cave entrances that he had not seen for many years. He talked with enthusiasm and interest of our biological work and of our cave explorations and was eager to have us return for a longer stay. His enthusiasm and instant offer of friendship to complete strangers left a lasting impression on all of us, as it doubtless has on hundreds of students and biologists before us. His death, especially under such tragic circumstances, is a great shock and will be regretted by all of his many friends and by the many acquaintances such as us who knew him only in passing.

James Reddell



JOHN WILLIAM FRANCIS HARRISON

**BORN BAYSVILLE ONTARIO CANADA JUNE 21 1901
MURDERED RANCHO DEL CIELO MEXICO JAN 29 1966**

A SINCERE STUDENT AND GIFTED TEACHER

The Biology of the Caves of Rancho del Cielo

by James Reddell
Austin, Texas

Rancho del Cielo is located in the northernmost section of Cloud Forest in Mexico. It has been intensively studied by many naturalists and biologists over the past twenty years, and yet almost nothing is known of the biology of the caves of the region. The only previous collections in these caves includes a bat collected in 1950 by Marian Martin and identified as Artibeus cinereus axtecus Anderson and several amphibians collected by Paul Martin and reported by him in 1958.

Our own collections are only adequate to indicate the significance of the caves in the area. These were made by David McKenzie, Larry Manire, and myself in June 1964. Included in this report is a small collection made by Lawrence Gilbert in the summer of 1965. Collections were made in five small caves near the ranch house. The largest of these, Crystal Cave, was particularly rich in millipeds, but all contained troglobites of interest. Most were very shallow, not exceeding 30 feet in depth, with the exception of Harrison Sinkhole which attained a depth of 180 feet.

Following is a systematic summary of the fauna of the caves of Rancho del Cielo. When it is considered that only five small caves have been studied and of these only the millipeds and spiders are adequately represented it will be seen how superficial and yet promising are the caves in this area.

Salamanders - All of these were collected by Paul Martin. Two specimens of the large, brightly colored plethodontid, Pseudoeurycea belli, have been taken from caves in this area. One was found in Crystal Cave by Frank Harrison and the other was taken in an eighty-foot deep pit, named by us Balanced Rock Cave but not entered because of lack of time. Pseudoeurycea scandens is a common inhabitant of caves and fissures at Rancho del Cielo. About ten caves and sinks were found by Martin to harbor this species. Chiropetrotriton multidentata is a very common inhabitant of caves and most specimens have come from caves. Although no specific localities are cited by Martin, he found it in many caves and sinks at the ranch. Another species, Chiropetrotriton chondrostega, does not appear in the darkness of caves, but is common in open sinks, including Balanced Rock Cave, where six were found. It usually occurs under debris, rotten branches, and leaves at the bottom of the sink. Two other sinks at Rancho del Cielo, 12 m. in depth, yielded eight C. chondrostega.

Frogs - Three species of frog have been collected by Paul Martin at Rancho del Cielo. Syrrhophus latodactylus has been collected in Crystal Cave, as well as in other caves from this general vicinity. Eleutherodactylus hidalgoensis is almost exclusively found in caves, with about sixty having been taken from Rancho del Cielo. Rana pipiens is common throughout North America and is usually found about ponds and streams. In karst regions, however, it is fairly rare and only a few specimens

have been found even at Harrison's artificial spring at Rancho del Cielo. One specimen was taken from a shallow sinkhole into which it had apparently fallen. A fourth species of frog, Eleutherodactylus augusti, is frequently found in caves but none have been reported from the vicinity of Rancho del Cielo. It is expected that it will eventually turn up in the caves and sinks there.

Millipeds — The most interesting aspect of the caves of this area are the millipeds. There are nine species represented in our collections, of which at least four are troglobites. One of the most interesting species is Glomeroides promiscus Causey, a member of the order Glomerida. This order was previously reported from only two localities in Central America. This species was described from material taken in Sótano de Gomez Farías. It is represented in the collections from Cuevas de Rancho del Cielo No. 3 and No. 7. A second troglobite is Mexicambala russelli Causey, described as a new genus and species from caves at Xilitla, S.L.P. This material was taken from Crystal Cave and Harrison Sinkhole and apparently represents an undescribed subspecies. A third troglobite is an undescribed species of the genus Sphaeriodesmus in the polydesmid family Sphaeriodesmidae. This is a large white milliped which rolls itself into a ball when disturbed. It has been taken in Wet Cave, Crystal Cave, and Cuevas de Rancho del Cielo No. 3 and No. 7. The most distinctive troglobite in the caves in this area is a slender delicate white milliped several inches long and representative of a new genus and species. This form has been taken in Wet Cave, Crystal Cave, Harrison Sinkhole, and Cuevas de Rancho del Cielo No. 3 and No. 7. In the latter cave it is particularly abundant, covering silt banks almost completely. Troglomorphic in Crystal Cave is an extremely small milliped representative of a new genus and species in the family Stylodesmidae. This gray milliped is also common in caves in other parts of the Sierra de Guatemala. A third new genus and species, this time in the family Rhacodesmidae, has been taken by Lawrence Gilbert in an undesignated cave at Rancho del Cielo. An epigean form, it has also been found in two other caves in the Sierra de Guatemala. A large beautiful delicate blue milliped belonging to the genus Parachistes and common in the Cloud Forest at Rancho del Cielo has also been collected in Cueva de Rancho del Cielo No. 7, where it may have accidentally fallen. One species of milliped is known only from Crystal Cave and Wet Cave. It is an unidentified genus and species of the family Cleidogonidae and may be an undescribed genus. It is an epigean form, but may be a troglophile. A species collected only in Crystal Cave is tentatively assigned to the genus Siphonophora and is probably a troglaxene or accidental.

Beetles — The beetle fauna is particularly poorly represented in our collections but two specimens have been identified. One of these is a staphylinid or rove beetle and is Belonuchus sp. nr moquinus Causey. This common form was found in Crystal Cave under rocks. The second form is of considerable interest. It was taken by Lawrence Bilbert in an undesignated sinkhole and is representative of a new species of carabid beetle of the genus Mexisphodrus. This possible troglobite has also been collected in Sótano de la Joya de Salas on the western side of the range.

Unidentified beetles have been collected in Cueva de Rancho del Cielo No. 7 and Wet Cave.

Diplura - Possibly troglobitic members of the family Cam-podeidae have been collected in Cuevas de Rancho del Cielo No. 3, No. 7 and Crystal Cave. They are presently under study.

Crickets - One unquestioned troglobite and one probable troglophile are represented in the cricket fauna of the area. The troglobitic form is an undescribed species of the gryllid genus Paracophus. This is a completely blind form and the only completely blind gryllid in the New World. It was taken in Harrison Sinkhole. The troglophile, found in Cueva de Rancho del Cielo No. 3, has been identified as Paracophus apterus Chopard, a form also recorded from caves in the Valles area. When more careful collections are made in this area this group will certainly appear in many caves. A cricket of the Family Stenopelmatidae, Stenopelmatus sp., has been collected in Crystal Cave where it inhabits the entrance area.

Spiders - Spiders were taken in three caves at Rancho del Cielo. By far, the most interesting specimen was a new species of the genus Leptoneta. This family is comparatively rare, but is a common inhabitant of Texas caves. Its appearance in Wet Cave is of considerable interest. Other specimens taken from Wet Cave are all immature. These include Aphonopelma sp. and Ctenus sp. A single species is recorded from Harrison Cave and has been identified as Modisimus sp. Crystal Cave contained two forms, Stemmops sp. and an unidentified genus and species of the family Pholcidae.

Other fauna - Among miscellaneous animals taken in the caves the most interesting is possibly a species of isopod taken from a tiny pool in Crystal Cave. This is certainly a troglobite but has not yet been studied. Also from Crystal Cave is an, as yet, unidentified pseudoscorpion. Other unidentified fauna includes centipedes from Harrison Sinkhole and harvestmen from Wet Cave.

In conclusion, it can be stated only that the collections in these caves promise an even richer fauna than that found in other parts of Mexico. The caves investigated proved that even the shallow sinks and small caves were richly inhabited and that an intensive investigation of other caves in the area would certainly reveal new forms, possibly as exciting as some already collected.

- References: Causey, Nell B. 1964. "Two new troglobitic millipeds of the genus Glomeroides from Mexico (Glomeridae: Glomerida)." Proc. Louisiana Acad. Sci., 27:63-66.
- Goodwin, George G. 1954. "Mammals from Mexico collected by Marian Martin for the American Museum of Natural History." Amer. Mus. Nov., 1689:5.
- Martin, Paul S. 1958. "A biogeography of reptiles and amphibians in the Gomez Farías Region, Tamaulipas, Mexico." Univ. Michigan, Museum of Zoology, Misc. Publ. 101., 102p.

Note: This is the first of a series of reports on different aspects of cave biology in Mexico. Whenever possible a report on an area or on a recent collection of unusual interest will be prepared and included in the NEWSLETTER. Any suggestions are welcomed. Anyone making a trip into Mexico is urged to make collections of cave fauna and to send them to the author. They will be studied by specialists and a report sent to the collector as to their identity and interest. Specimens should be preserved in 70% isopropyl alcohol and jars filled completely to the top to prevent damage to the specimens.

Notes on Sótano de Tlamaya

by Terry Raines
Austin, Texas

The exploration of Sótano de Tlamaya has become somewhat simplified now, since the stage of pure exploration and mapping has been past. On previous trips the exploration party would carry up to 500 feet of extra rope, expecting to come upon some deep drop in the far reaches of the cave. Now, with the cave totally explored, it is known exactly what lengths of rope to carry and where they will be used.

The purpose of this article is to give an idea of the exact nature of Sótano de Tlamaya and what one should expect on a trip through the cave. Below are listed the factors that influence exploration.

Drops and equipment

Most of the drops that require equipment are located before the Big Room, (see map). The few exceptions are located along the downstream passage, the furthest being the Pinnacle Drop 2717 feet from the Big Room. There are several things to keep in mind concerning the rope work. The list on page 16 shows only the drops where equipment is absolutely necessary. Throughout the cave much chimneying is required with several difficult climbs necessary to avoid the deep pools of water. So, in many cases it might be advisable to carry a couple of 20 to 30 foot handlines. Another aid is to have someone block the flow of water down the drop by standing in the water at the top edge of the waterfall. In this manner the water is stopped long enough to provide a chance for another person to rappel down and stay relatively dry.

In the past the rope most often used has been 7/16 inch Goldline. No problems have been encountered with this rope, and the same holds true for 1/2 inch and 7/16 inch Du Pont 707 Nylon, the only other type of rope used. As for personal equipment, it is carried in one small side pack and held to a minimum. It usually includes a seat sling, two brake bars and carabiners, two Jumar Ascenders (one for the seat sling loop and the other for one foot loop), two baby bottles of carbide, flashlight, hard candy and several small cans of food, and sometimes an extra

shirt or light jacket which is worn while resting or after falling into a pool of water. Any special equipment, which is determined by the purpose of the trip, can be divided among the group. All above equipment can be fitted into a standard Army side pack, which leaves the explorer's arms and legs free for climbing.

Drops in Sótano de Tlamaya

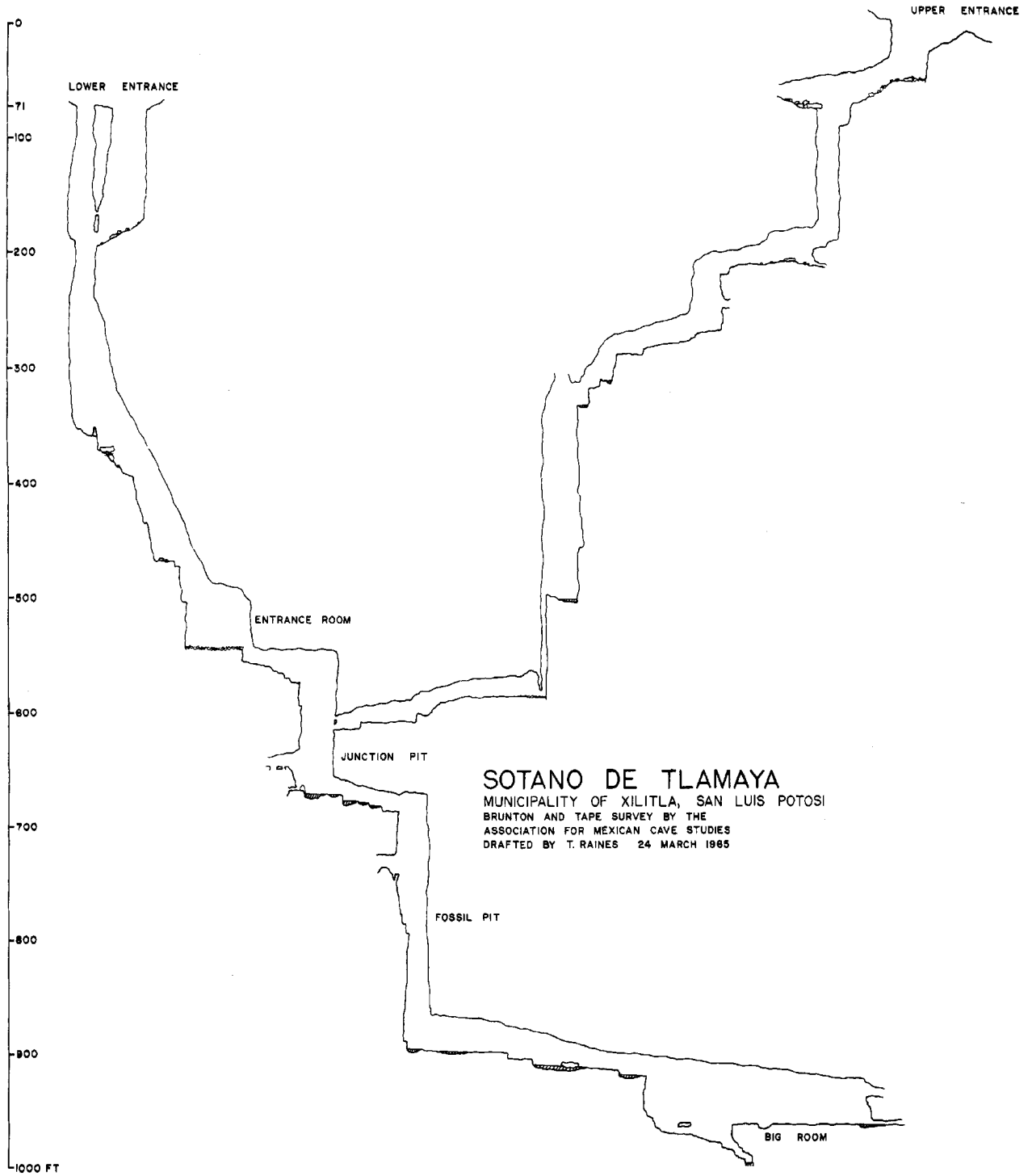
Actual depth	Minimum rope needed	Comments
279', 73', 76'	520'	Entrance Drops, rope tied at all drops to eliminate slack.
100'	120'	Junction Pit, tieoff to solution hole 25' from drop; loop rope over projections on right wall to avoid waterfall.
209'	250' or 90' & 100'	Tieoff to solution pocket 27' from drop; drop can be rigged in two parts with climb-down between.
42'	50'	Last drop before Big Room.
25'	30'	Used as a handline down a steep flowstone waterfall
40'	50'	Stream drops through narrow channel for 25'; avoid it by climbing up to left to top of a "wall" then rappel down; tieoff in solution pocket just back from top.
32'	45'	Immediately before Pinnacle Drop.
97'	115'	Pinnacle Drop, is rigged from "window" to left of waterfall; rappel 20', traverse ledge to pinnacle overhanging center of pit, loop rope over, and rap-pel on to bottom.

Water conditions

The cave as a whole is very wet but the water poses no great problem to exploration. Along the passages there are many deep pools which make several tricky traverses necessary to avoid the water. An arroyo runs in the entrance, but it is dry except during the heaviest of rains. The first real stream in the cave issues from a small side passage in the Entrance Room, 475 feet below the Lower Entrance, and continues on down the various drops to a point just before the Big Room where it siphons. The other stream in the cave is encountered at the far end of the Big Room. It begins in a large section of the cave, flows past the Big Room, and on to the end of the cave. Groups have been in the cave while

it has rained three and four inches during the night and they have noted only a small rise in the rate of flow of both streams. This is probably due to the fact that there are so many sink-holes and passageways in the limestone of the Tlamaya area that no one system carries a very large percentage of the water. From all signs observed in the cave on previous trips, the streams never reach a really high level or become raging torrents, even during the very heaviest of rainfalls. This was proven recently when a group visited the cave after nearly a week of continuous rain. They found that objects that could be easily moved by even a small stream (empty Clorx bottles, cans, clothing) remained in the places where they were left, some only a few feet above the normal low level of the water. One consideration, that is of great interest, is that after the recent, nearly week-long rain, the whole water table in the area rose and flooded the last 130 to 200 vertical feet of the cave. This was the first rainfall of such magnitude in several years. The normal rainy season is during the summer months. During this period the level of the streams does rise somewhat and may cause flooding in a small section of the cave near the end. So, perhaps the best time to explore the cave is between Christmas and Easter.

Sótano de Tlamaya is no "easy" cave. Even though, in view of the information above, exploration seems simple and clear cut, there are many unseen dangers that could mean the difference between success and death. Perhaps the greatest danger is from fatigue. It may seem easy going in, but after you have reached your goal the real work begins. It's a long prusik out and many a stout caver has sworn he wasn't going to make it. One also has to keep in mind that an average trip through the cave takes between 25 and 35 hours of steady caving. A long time! To make matters worse there is the loss of energy due to the cold. An air temperature of 68°F and water 64°F may not seem cold to you now, but when you're soaking wet and trying to get a few minutes rest on a gravel bar, that shivering isn't your imagination. Another hazard, that is unavoidable, is that of an accident. The only precaution one can take is just to be careful and make sure his equipment is in good shape. Even the most minor of accidents could be fatal, for the nearest people that could render any aid are here in Austin, 800 miles away. It is suggested that anyone planning to go to Mexico first contact the AMCS. Here they can learn of the latest developments in the area or caves they plan to visit, but most important, they can let someone, who can help, know where they will be in case there is an emergency.



The Deep Caves of the Western Hemisphere

by A. Richard Smith
Austin, Texas

Mexico offers deep caves, almost at every step; one of these could, if all the conditions are right, turn out to be the deepest in the world. In order to see how Mexican cave depths compare to those of the rest of the Western Hemisphere, I have prepared the following list. Much of this information has come from the admittedly incomplete list of the deepest caves of the world edited by H. Trimmel at the IV International Congress of Speleology, prepared in December, 1965. Because the list includes only caves at least 200 meters deep, this half of the world is not well represented. In fact, the whole Western Hemisphere contributes only 5.1% of the caves as deep as 200 meters, while France has 34.1% and Italy 20.0%. The approximate rank in the Trimmel list is given for each cave.

Rank	Cave name	Location	Depth	
			meters	feet
1	Gouffre Berger	France	1122	3648
2	Sima de la Piedra de San Martín	Spain	1110	3609
27	Sótano de Tlamaya (Deepest cave in Western Hemisphere)	Mexico	454	1488
52	Pozo Prieto (Explored by Polish expedition in 1961)	Cuba	380	1247
57	Neff Canyon Cave	Utah, USA	357	1170
85	Carlsbad Caverns	N. Mex., USA	308	1011
114	Sótano de la Joya de Salas	Mexico	273	896
125	Cueva Juara	Cuba	267	876
147	Dunn's Hole	Jamaica	250	820
158	Bull Cave	Tenn., USA	242	794
159	Sótano de Huitzmolotitla	Mexico	240	789
200	Ape Cave	Wash., USA	214	702
236	Spanish Cave	Colo., USA	204	670
238	Gruta del Palmito	Mexico	203	667

What to Publish?

While attending the NSS Convention at Sequoia National park, I was able to talk with many AMCS members concerning the latest caving being done in Mexico and what was being published in the AMCS Newsletter. I suddenly realized that we have been failing to print much valuable information that we somehow took for granted everyone knew. For instance, one person asked me what kind of equipment we used during the exploration of Sótano de Tlamaya and in particular the type of clothing worn. After checking over back issues of the Newsletter, I find that this question is not answered in any of the several reports. This, of course, should not have happened, but to those of us writing these reports who are so familiar with caving in Mexico, we tend to overlook these small but important details.

The best way to solve this problem would be for members to write and tell us exactly what questions they have and what type of article would be of interest to them. Maybe, if the quantity was sufficient, we might even start a "Letters to the Editor" column and answer many of the questions members have about Mexican speleology. In any case, write us a letter today so we can improve the AMCS Newsletter for you.

T.R.

The AMCS Newsletter is published six times a year by the Association for Mexican Cave Studies, P.O. Box 7672 University Station, Austin, Texas 78712. Membership in the AMCS is \$5.00 for the calendar year, with memberships starting at the first of each year. Persons joining after the first of the year will receive all back publications for that year.

Members are urged to submit articles for publication. The article may cover any phase of Mexican speleology. Also, trip reports are requested from all trips.

Editor..... Terry Raines
 Treasurer..... Philip Winsborough
 Staff..... A. Richard Smith

THE ASSOCIATION FOR
MEXICAN CAVE STUDIES

NEWSLETTER

TRIP REPORTS

Cañón de la Huasteca, N. L.

Monterrey, N. L.

Galeana, N. L.

Roads between Monterrey, N. L. and Cd. Victoria, Tamps.

Zaragoza, N. L.

Sótano de Montecillos, S. L. P.

Cd. Valles, S. L. P.

Cd. Valles, S. L. P.

Cd. Valles, S. L. P.

Xilitla, S. L. P. Region

NEW COLLECTING REGULATIONS

TRIP REPORTS

Persons: David McKenzie, Marsha Meredith, Bill Russell,
Carol Westmoreland

Date: 3-6 February 1966

Destination: El Cañón de Huasteca, N. L.

Reported by: Bill Russell

Marsha Meredith, David McKenzie, Carol Westmoreland, and Bill Russell left Austin about five on the third of February, and camped along the Río Sabinas near Sabinas Hidalgo. The next day we drove through the rain and mist to Huasteca Canyon just to the west of Monterrey. Following instructions carefully copied from the Texas A & M University bat-hunters' files, we made our way under lowering clouds up the impressive Huasteca Canyon. About five miles from the end of the pavement our map indicated a right fork leading to the cave, and by the time we reached this junction the clouds had descended to within a hundred feet of the road. Ten miles further the map showed a trail leading up to the cave, and we reached what appeared to be the trail just as the fog closed in. The only person we could find was somewhat vague about the exact location of the cave, La Gruta de San Bartólo, but he had heard of it. Regarding this as a favorable omen we started up the trail through the fog. About a fourth of the way up the canyon we located a small cave perhaps 60 feet long, but visibility was zero. We returned to the car and drove down the road to ask for a better location. About a mile down the road we could hear machinery working and stopped and talked with the operators. They said the cave was nearby and that as soon as the children returned from tending the goats they would take us to the cave.

In a short while the guides appeared out of the mist, and leaving the girls at the car to cook lunch, David and I followed our guides up the mountain. After a short hike we reached the small entrance to the cave which was definitely not the cave we were looking for. A brief reconnaissance with three books of Texas State Bank matches revealed about 200 feet of breakdown-floored rooms. We then returned to the car and had a brief lunch amid great rumblings from high above in the fog. (The girls had had to move the car to avoid falling rocks.) During lunch a passing truck driver informed us that the cave was in another canyon, and we were on the wrong road. He also warned us that the cave was dangerous due to "ongos", but was unable to explain exactly what they were. Following his directions we reached the cave just before sundown. The next day was spent in collecting and mapping in the two caves we had found. The northmost cave of the two Grutas de San Bartólo contains about 1500 feet of mostly walking passage with several rooms and domes. The cave is floored with dry, dusty guano. The south cave is only about half as long but contains numerous, though badly vandalized, formations. In one relatively undisturbed area there are blue celestite crystals growing out of white powdery formations. On the return trip we visited two small caves high in the wall of the canyon. The largest of these was about 100 feet long and went completely through the narrow ridge. The view across the canyon of the vertically bedded spires of rock makes the Grand Canyon seem like a freshman geology trip. The rest of the return trip was uneventful.

Persons: Ed Alexander, Bob Burnett, John Fish, Susan Loving,
Jim Mead
Date: 30 April-1 May 1966
Destination: Monterrey, N. L. area
Reported by: John Fish

On Friday, April 29, we headed for Monterrey with the ambitious project of mapping the famous Grutas de Villa de García and further exploring Cueva de La Boca (also called Grutas de Santiago). García is operated by the Lions Club of Monterrey and García. After gaining permission on Saturday to map the cave, we drove about thirteen miles west of Monterrey on the Saltillo highway, then turned north to the town of García, following the road on to the cave. The high, steeply bedded mountains along the route are quite impressive.

Saturday afternoon we took the exciting cable car ride up to the entrance. Our altimeter showed the difference in elevation to be close to 700 feet, although the locals claim 900 feet. Since time was limited, Jim and Bob formed one mapping team and Ed, Susan, and John formed another. The cave has two shelter-like entrances in the cliff face, each with a small opening into the large chamber beyond. This large room, measuring about 700 feet long and up to 240 feet wide, and a smaller room 270 feet long and 100 feet wide, comprise the major portion of the cave. Large columns and stalagmites, flowstone curtains, and giant pieces of breakdown larger than several houses are characteristic of this dry cave. There are numerous alcoves with smaller formations and crystals, and a "theater" formed by a semicircle of columns on a large breakdown block. Also in the large chamber is a 350 foot high skylight with the ceiling of the cave arching up to 170 feet directly below it.

We left García when the cave closed for the day and drove south of Monterrey to Santiago, where we turned east into the mountains, arriving at Cueva de La Boca about sunset. Mining operations stop only on Sunday, so that is the only day when people are allowed to visit the cave. The entrance is approximately a square, 100 feet on a side. Sunday morning we began mapping at a point 700 feet back in the cave (end of previous survey) where a 50 foot in diameter dome extends completely out of sight, even by flashlight. After about 300 feet more of passage, we came to a room 140 feet in diameter with no visible ceiling. Since this was the end of the horizontal passage, we began mapping up the wall. The Mexicans have built a 110 foot high tower near the wall to gain access to phosphate deposits above. From the top of the tower we scaled the walls until Bob and Jim reached a point 376 feet above the floor where technical equipment will be necessary. A three cell flashlight still did not reveal any sign of the ceiling. Lacking enough equipment, we returned to the Land Rover and headed for García again to finish mapping the smaller room. After two hours we finished our map and returned to Austin. Maps of both caves will appear in later publications.

Persons: Dr. Roger Albach, Dr. F. P. Griffiths, Filmore
Meredith, Tom Warden
Date: 30 April-1 May 1966
Destination: Galeana, N. L.
Reported by: Tom Warden Weslaco, Texas

This cave trip did not show where the caves were, but where they were not. We intended to leave Weslaco, Texas at noon so as to arrive at Galeana before dark, but a late start and a greedy border guard held us up so that we had to negotiate the winding pass up from Linares to Galeana after nightfall. The prospect of meeting an egotistical Mexican cow or one of those heavily laden barium trucks on the darkened mountain roads did not set too well with us. The trip was well worth the time even though we saw only one reasonable cave. On the trip back, we stopped to inspect the forty foot high mural carved into the shiny black rock next to the road just a few miles inside the pass. The pass itself is very beautiful, with many suspicious cave entrances just below Iturbide, which, being built in the pass, is one of the longest and thinnest towns that I have seen. The first night, we sacked out at Dr. Griffiths cabin a few miles south of Galeana on the road to Doctor Arroyo. Before this trip we had hoped to use his cabin, but now see that it is too far away from the best cave area. The next morning Dr. Griffiths and a local rancher friend of his led us into the mountains to the south in search of caves. One of the ranch workmen led us first to La Gruta de Montés, a small cave hardly 140 feet long. The one room in the cave averages 10 feet high and 30 feet wide. Next Dr. Griffiths took his non-caver guests to see some scenery while Albach, Meredith and I were left with the Mexican to see some more caves. This was a definite mistake for there was a language barrier. We were led down a long, steep, tree-covered slope to a creek and up the other side to La Gruta del Leones; a long, tiring scramble to a disappointing shelter cave hardly 12 feet deep. After a welcome rest we returned by another, "menos difícil", route back to where we were to meet Dr. Griffiths. On the way we passed a narrow crack into which I descended with some difficulty, but which ended after 10 feet. We also found a jug-shaped cave about 30 feet deep. It has a neck entrance about 3 feet across which widens immediately to a large room below. The next day we accompanied Dr. Griffiths to "Puente de Dios", the natural bridge reported by Ed Alexander. (See AMCS NEWSLETTER, Volume I, Number 12, page 116.) Descending below the bridge, we checked out two shelter caves but found nothing worthwhile. (Someone may later find a crawlway that we overlooked in our hurry.) Upstream from the bridge there is a cave at water level that goes back for some 40 feet and turns right. We did not check this out after we found fresh cat tracks and a torn and shredded pants and shirt in the entrance. We called this cave La Gruta del Gato.

Note to biologists: Downstream from the bridge there is a very thin and high waterfall that slides down the slick rock face. Near the bottom the water leaps from pool to pool, all of which teem with aquatic fauna.

From the local residents we learned that the largest cave in the area is downstream from the bridge. Like Alexander, we were told of the "many caves" area to the northwest. To get there,

go north of Galeana to Ranchero Souse. Get a guide there, cross the arroyo, and take the left-hand fork. Ed said that this is definitely a jeep or truck road, so come prepared.

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Note: The following reports are from trips made during the Easter holidays. The purpose of these trips was to obtain information for the forthcoming AMCS BULLETIN entitled "The Caves of the Inter-American Highway; Nuevo Laredo, Tamaulipas to Tamazunchale, San Luis Potosí".

Persons: Dolores Garcés, Jim McLain, Bill Russell, Carol Westmoreland
 Date: 7-10 April 1966
 Destination: The roads between Monterrey and Ciudad Victoria
 Reported by: Bill Russell Austin, Texas

Over the Easter holidays Dolores Garcés, Carol Westmoreland, Bill Russell, and Jim McLain (from Texas A & M University) went to Mexico to visit caves and finish the road log between Monterrey and Ciudad Victoria. The first night we camped at Sabinas Hidalgo beside the Río Sabinas. Friday morning we drove south through Monterrey to Cueva de La Boca (Gruta de Santiago). This impressive cave has an entrance which is about 100 feet by 100 feet, and one can follow a large passage back to a 4 by 4 foot tower extending 110 unsupported feet to a ledge and unexplored upper levels. Except during the holidays, miners are at work in this cave day and night. From La Boca we drove south to Montemorelos and then followed the road west through the canyon of the Río Pilon to Rayones, visiting Cueva de Chorros de Agua on the way. This cave is small and located below a cliff on the south side of the Río Pilon canyon. The trail to the cave leaves the road about 100 feet east of the spring by the shrine. The cave is composed of two medium-sized rooms connected by a short stoopway. The entrance room is partly choked by breakdown, and the side room is high and narrow. A few bats were the only fauna observed. Saturday we logged the road south to Ciudad Victoria and visited a cave that is a shrine to the Virgin of Guadalupe. The cave is entered through a church and one passage of the cave was almost blocked by discarded crutches and casts of those cured at the shrine. Sunday we visited Huasteca canyon and Grutas de Villa de García before returning to Austin.

Persons: Orion Knox and Mills Tandy
 Date: 6-9 April 1966
 Destination: Zaragoza, N. L.
 Reported by: Orion Knox

On April 6 Mills Tandy and I left for McAllen, Texas and parts south. We arrived at the border about midnight and got through customs with only a little trouble. Leaving here we drove on until about 4:00 AM when the fog finally stopped us near San Jiménez. Bright and early (ugh) the next morning, about 7:00, we

were on the road again, this time for Ciudad Mante. Stopping only for gas in Ciudad Victoria we arrived at Mante bright eyed and bushy tailed about noon, and drove straight through and on to the little town of Pachon, just beyond El Abra Pass. Here we got directions to Cueva del Pachon. (See AMCS NEWSLETTER, Volume I, Number 2, page 16 and 17b.) We then drove to a point just down the hill from the cave and started up the trail with our ice boxes, for fish, not beer, and our six guides. The cave has a short scramble—in entrance then a walking passage on back to the water where Mills was going to hunt for blind fish. He took a number of air and water temperatures then we ran the seine for about 50 feet catching about 100 or so fish, all he needed. This was great because John Fish had said there were only a few there. Just about this time we began to hear a growing rumble in the background and began to wonder what was up. Soon we found out that about 40 people from town had decided to see what we were doing and had made a number of torches and had come into the cave. Getting things straightened out we and our 46 guides headed back for the entrance and on down to the car. Our next project was to catch some fish in a nearby stream which took about three hours. Leaving here we headed back to Mante where we stopped at Chico's Restaurant which looked like a place for a couple of muddy cavers to eat. Walking through a small door we were greeted by a waiter with a black coat and tie on. He led us around the corner to a plush restaurant with all the works: pink table cloth, crystal water glasses, flowers on each table, and over-looking a fancy swimming pool. Surprised that we didn't get kinked out, we ordered what turned out to be a very good and not too expensive meal.

It was then back to the road and try to get as far north again as possible. Finally about 3:00 AM we reached the outskirts of Linares and made camp. By 7:00 the next morning we were back in the car and heading for Galeana, stopping only to take pictures occasionally. Upon reaching the Galeana cutoff we stopped at a cafe and got a bite to eat and asked about local caves or sinks. We were told of a good many in the area, one of which we decided to check. To our surprise the expected grode gypsum sink turned out to be quite impressive. It was in a flat wheat field and was 200 feet across and over 300 feet deep at the deep end with sheer walls all the way. Not having enough rope we took pictures and headed on for the Cueva de Cuesta Blanca near Zaragoza. Arriving here about sunset we proceeded to survey it to a depth of about 150 feet where it turned into a 6 inch in diameter crawl. It was a very nice gypsum cave considering what many gypsum caves turn out to be.

Getting up early the next morning we drove into Zaragoza where Mills hired a couple of boys to guide him to the nacimiento where he wanted to seine for fish. I grabbed a side pack with some food and my cameras and headed for the base of Cerro Viejo where I planned to find a route up the face. During the day I climbed an adjoining 8500 foot peak and photographed the face in detail and also found a couple of cave entrances. I had no flashlight so was only able to go down into them for a short distance. After getting caught in a thunderstorm I made my way back down where I met Mills. After eating in Zaragoza we headed for Austin, arriving about 5:00 Monday afternoon.

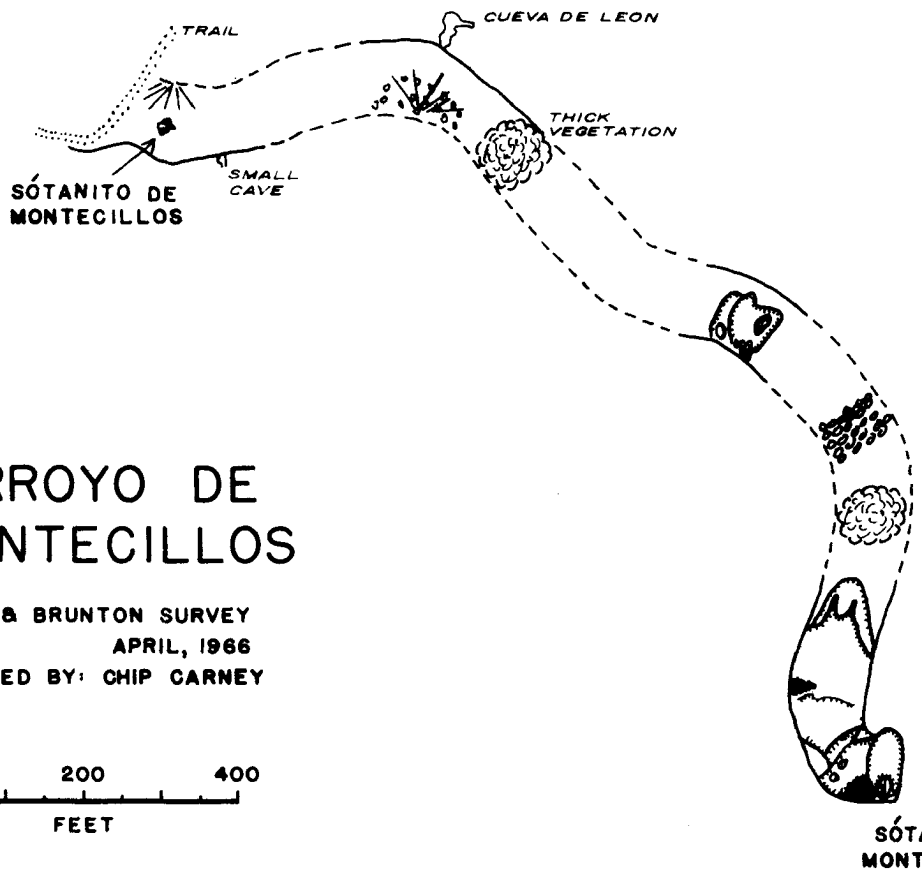
Persons: Chip Carney and Don Erickson
 Date: 6-11 April 1966
 Destination: Sótano de Montecillos
 Reported by: Chip Carney

During the Easter vacation Don Erickson and Chip Carney went to the Ciudad Valles area to map and continue the exploration of the Sótano de Montecillos cave system. (See AMCS NEWS-LETTER, Volume I, Number 3, pages 31 & 32.) They mapped the arroyo from the Sótanito de Montecillos to the end of the arroyo where it enters Sótano de Montecillos. The upper level passage of the Sótano was mapped for 600 feet to a point where it became a water crawl. The pit to the lower level was also entered and the main downstream passage explored.

The Sótano de Montecillos cave system, 4.5 miles north of Ciudad Valles, is the southernmost of the caves near the village of Los Sabinos. It is 2.5 miles east of the Cd. Valles-Cd. Mante highway. Good dirt roads allow cars to get within 1/2 mile of the arroyo which drains into the caves. The Sótanito de Montecillos is located in the floor of the arroyo. As reported by D. McKenzie, it is a vertical well approximately 110 feet deep with a passage system at its bottom going south and southeast for "about 2000 feet" to a lake. Lack of flotation equipment halted McKenzie's exploration and the cave has not been entered since.

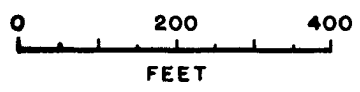
From the Sótanito the arroyo goes to the east for 300 feet. Then it gradually curves to the right to go south. Just before reaching the Sótano de Montecillos the arroyo makes a sharp bend to the left to approach the cave from the west. (See map.) The arroyo dead-ends in a sheer cliff 150 feet high. During heavy rains all of the water of the arroyo goes down the 45 foot vertical entrance drop. The entrance pit is 75 feet wide and about 50 feet across. From this 45-foot level a 30 by 30 foot passage goes west, back under the arroyo. The passage remains large for about 200 feet. Then it becomes much smaller; 10 feet wide with the ceiling varying from 5 to 10 feet high. After another 150 feet the passage becomes very low (1 1/2 to 2 feet) for several yards. It then opens up again to permit walking. At this point a lake begins. Blind fish were observed here, as in all other pools in the cave. Six hundred feet from the entrance this passage becomes a water crawlway. Exploration has not gone beyond this point. Two side passages branch south from the large section near the entrance. Each becomes a water passage after 50 to 100 feet. Neither have been explored. The water in the branch nearer the entrance is fairly clean and is a source of water for campers.

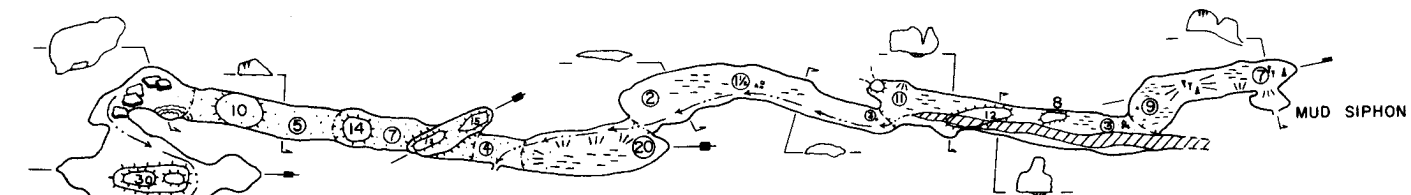
From the initial 45 foot entrance drop the water of the arroyo would go to the east in a large passage 20 feet wide and 50 feet high. The pit, encountered 150 feet inside the east passage, is 140 feet deep. The slick flowstone slope, which prevents close inspection of the pit, continues down the west wall of the pit. The wall ends 10 feet above a large lake. There is a natural bridge across the pit about 2/3 of the way down. By traversing to the southwest it is possible to swing to the opposite side of the bridge and continue on down to a breakdown floor and thus avoid the water. A water passage goes to the northeast. It is approximately 75 feet wide with a 20 to 25 foot ceiling. The water is



ARROYO DE MONTECILLOS

TAPE & BRUNTON SURVEY
AMCS APRIL, 1966
DRAFTED BY: CHIP CARNEY





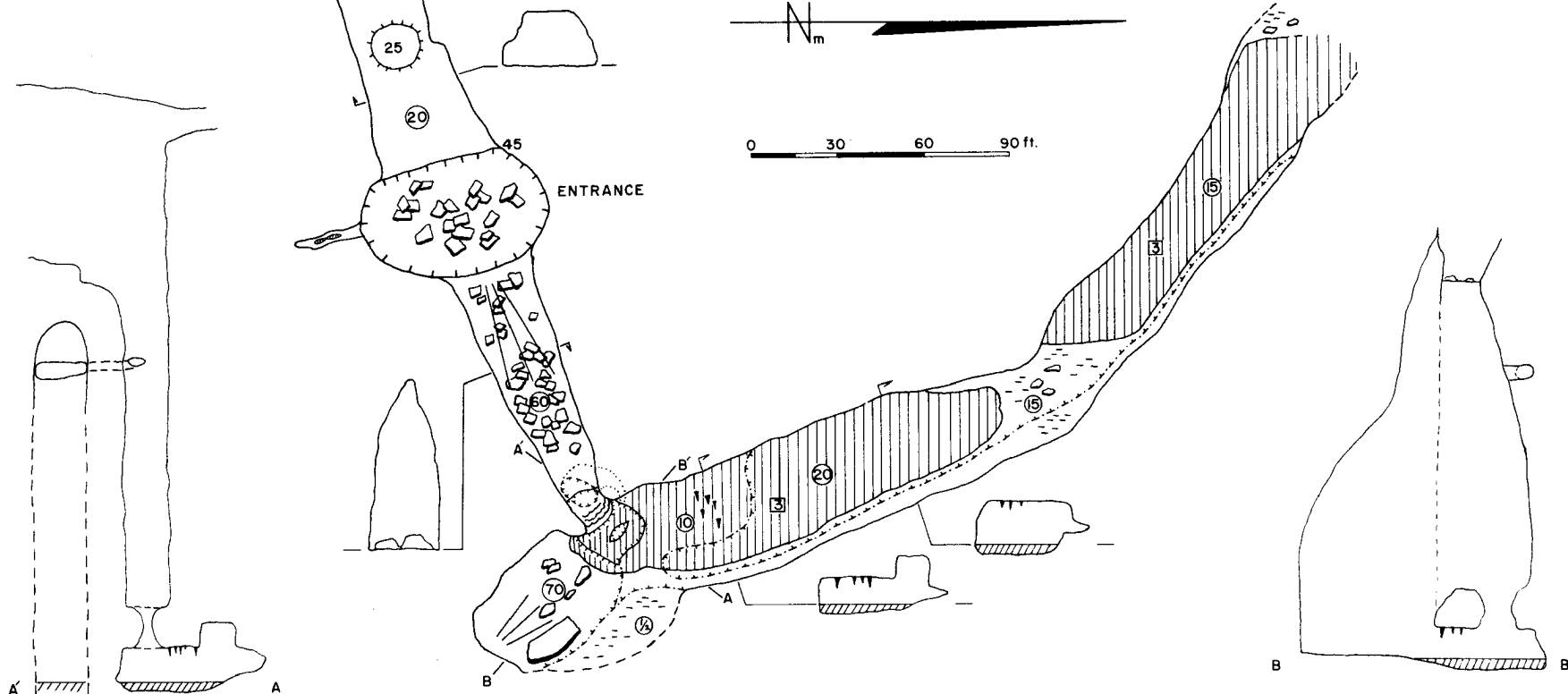
SOTANO DE MONTECILLOS

MUNICIPALITY OF CIUDAD VALLES, S.L.P.

BRUNTON AND TAPE SURVEY BY C. CARNEY AND D. ERICKSON 8 APRIL 1966

DRAFTED BY D. ERICKSON AND T. RAINES 26 OCTOBER 1966

AMCS



10 feet deep or more in many places. This passage has been explored only 300 feet. Flootation equipment will probably be necessary to continue exploration. A large number of blind fish were seen, some specimens at least 4 to 5 inches long. Large crayfish were also observed on the bottom. Eyespot reflections of the flashlight beam were observed in all of the crayfish.

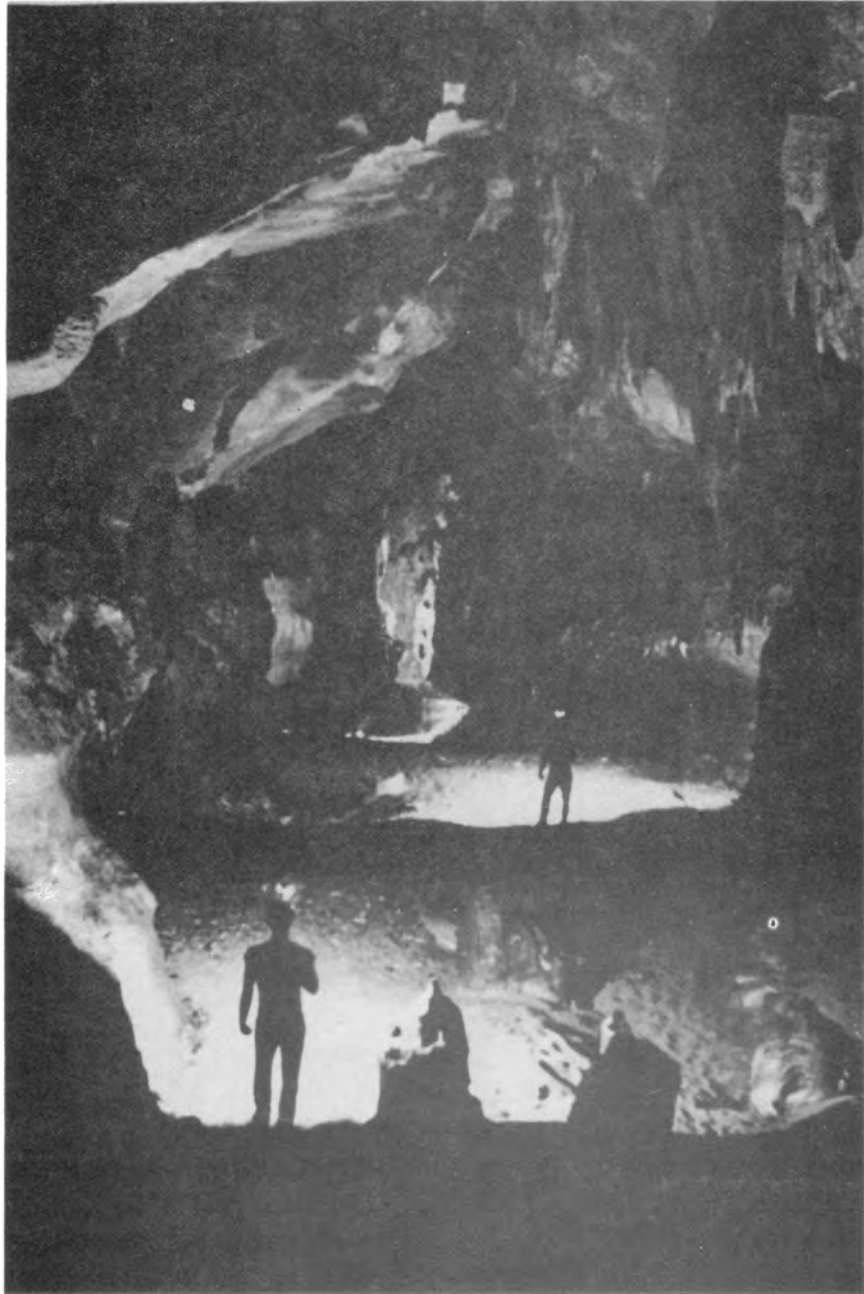
About 25 feet below the top of the 140 foot pit is a 2 foot by 5 foot wide hole in the north wall of the drop. This 75 foot crawlway, over solution etched limestone, curves to the west and ends in a dome pit approximately under the east entrance passage. The pit is at least 130 feet deep with deep water at the bottom. It has not been entered. Several large pieces of organic matter were found at the top of this pit so it must take a considerable amount of the flow when the arroyo runs. No connection was observed at the lower level between the two pits but a phreatic connection is possible. The west passage was surveyed with a Brunton and tape while the east passage was sketched.

The survey of the arroyo places the entrances of the Sótano and the Sótanito only 1260 feet apart. The entrance of the Sótanito is 94 feet above the entrance to the Sótano. Thus the passage level of the Sótanito is only about 30 feet above the upper passage level of the Sótano. A connection between the two caves is very possible. The "lake" passage of the Sótanito trends southeast toward the "water crawl" passage of the Sótano. Both passages are at the same general elevation, with the "upstream" portion slightly higher. Further exploration and mapping of this cave system should be an interesting project.

Persons: Ed Alexander, Ross Felton, John Fish, David McKenzie
 Date: 6-10 April 1966
 Destination: Ciudad Valles area
 Reported by: John Fish Austin, Texas

Over the Easter vacation Ross Felton of San Antonio, Texas joined our group from Austin as we headed for the Ciudad Valles area to continue mapping in Sótano de la Tinaja and roadlog the nearby highways. On Thursday morning we logged from Cd. Mante to Cd. Valles and, after obtaining permission from Señor Martínez, we proceeded to Tinaja. Our aim was to map the remaining known parts and continue exploration in this large system.

Thursday afternoon we drove to within a few hundred yards of the Tinaja entrance and set up camp about 300 feet inside the cave. We then began mapping the sink and the entrance passage. The arroyo tumbles down a series of climbable drops totaling 182 feet before the cave begins. We had with us a crude map made by the American Museum of Natural History which showed the entrance passage to be about 1400 feet long back to the first drop (see previous reports and description of Sótano de la Tinaja), but our survey found it to be over 1800 feet long and averaging 35 feet in diameter. In places a high fissure runs almost to the surface and has several small passages leading from it. Beetles, spiders, millipedes, and cirolanid isopods were collected. Exhausted by

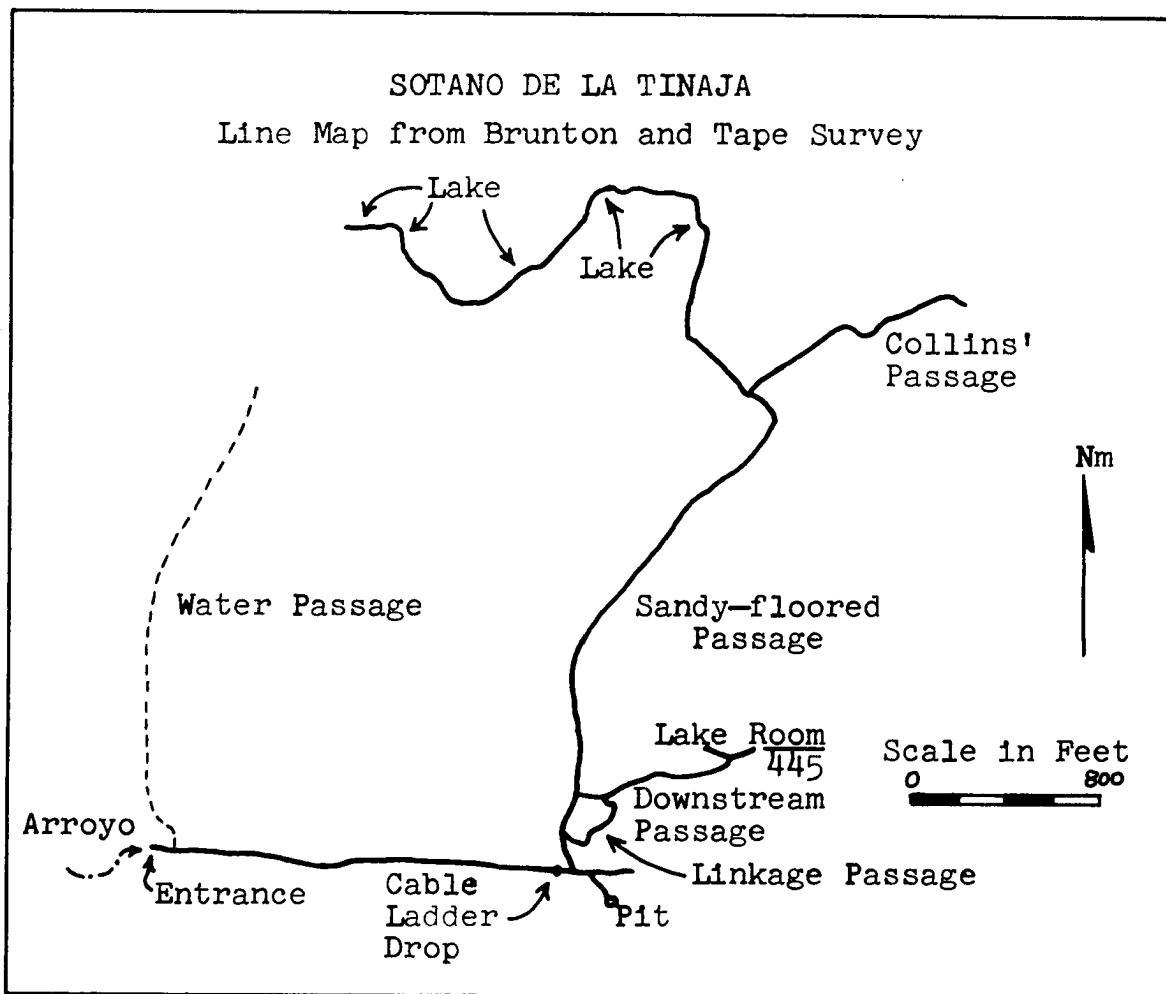


Sandy-floored passage in Sótano de la Tinaja.
Photo by David McKenzie

the trip and the long hours mapping, we returned to camp about 2 AM, egerly awaiting the next day when we would push on deeper into Tinaja.

After a leisurely breakfast the next morning, we walked down the entrance passage (it drops 62 feet in a horizontal distance of 1826 feet), climbed down the cable ladder drop (27 feet), and turned left to the Sandy-floored Passage. This day we planned to check all the leads off this passage except the downstream passage. After walking about 2000 feet, we came to Collins' Passage high on the right wall. This passage turned out to be a series of small rooms almost blocked by formations for several hundred feet, then a mud-floored room a couple of hundred feet long, and after more squeezeways finally a long room running diagonal to the passage. This last room contained two massive columns on the order of 40 feet in diameter and a deep mud fill, and was several hundred feet long. Two other short passages off the Sandy-floored Passage were mapped along with the 550 foot connecting loop to the downstream passage. Once again we returned to camp for the evening after having mapped more than 2000 feet of passage.

The next morning we returned to the Sandy-floored Passage to map the downstream passage which begins about 400 feet from the cable ladder drop. After a series of short drops and steep



slopes, made difficult by the thin layer of mud on the walls, we arrived at a large lake room developed along three large parallel joints. The room was about 75 feet in maximum width and 350 feet long. Most of the floor was covered by water (over six feet deep in places) in which were found a beautiful, blind, white shrimp (one of only three or four recorded findings in Mexico) and a rare Mysidacea. Exploration of the lake proved it to be a siphon, so we began the difficult climb out. From where it started going down, the downstream passage dropped 167 feet, making the total cave depth 445 feet.

Back at the base of the cable ladder drop, we followed the continuation of the entrance passage about 200 feet to the passage above the flowstone on the right wall. In a short distance we came to the unchecked pit. (This pit may have been checked by Bob Hosley and crew from Indiana but it is not absolutely clear in their report. See AMCS NEWSLETTER, Volume II, Number 1, page 1.) The pit is about 50 feet in diameter and drops 60 feet to a mud-covered floor. There are formations on the wall, and no passages were found to leave the pit at any level. On the far side in a little alcove there was a 5 foot drop to a pool of water, which might reveal a passage if it ever dries up during dry weather.

Since it was dark outside when we returned to camp, we decided to wait until the next morning to leave the cave. In the three days we had mapped another mile of passage, checked all of the leads except for the small passage a hundred feet inside the entrance, and extended the total mapped cave length to about 2 1/2 miles. On our way out Sunday morning, we met Charlie and Susie Loving and their group. After telling of our explorations, they decided to begin mapping in the unchecked passage. Their survey brought the total to 13,300 feet of surveyed passage without reaching the end.

After a good meal in Cd. Valles we drove east of town to road-log through the pass then north to Ventana Jabalí. Just before reaching the pass on the west side of the El Abra Range, I noticed that a large area on the north side of the road was sunken. People working at a cement plant said there were several caves nearby. We were led to a sink about 100 feet across and 50 feet deep, at the bottom of which a 25 foot high, 10 foot wide passage leads off. After about 50 feet there is a small skylight. In a few more feet the passage forms a "T", the lefthand passage ending after 30 feet, and the righthand passage decreasing in size and ending in about 100 feet. While in the righthand passage the ground began trembling - the cave was immediately christened "Sótano del Ferrocarril" for the railroad track is just a few feet from the entrance.

Driving on Tamuín, we left the highway, turning north toward Ventana Jabalí. We paused a moment to admire from a distance the impressive entrance to the cave before continuing northward. We had hoped to enter a rumored large cave called Cueva de la Ceiba, but the rancher was in Cd. Valles for the weekend. At this point we decided not to proceed north any further, and after stopping briefly to see Cueva de Taninul n. 4, we drove to Cd. Mante for the night.

Monday morning was spent mapping Sótano de San Rafael de los Castros, which was small but interesting. It lies a few hundred feet above a tiny nacimiento just north of Cd. Mante. The natives told us of some big sótanos and caves up on the plateau above. That afternoon we stopped to see Bee Cave, northwest of Cd. Mante, but time did not permit us to map the cave. The entrance appears to be about 120 feet across, 80 feet wide, and 320 feet deep with a huge pile of breakdown in the middle. It is not certain if our exploration was complete because of our limited time. The bedding planes dip approximately 75° in the entrance sink. It looks as if a large chamber were dissolved out and the roof just slid in. Of importance biologically was the finding of three blind fish, the first recorded in the Sierra de Guatemala. After leaving Bee Cave, we began the long trip home with the feeling that we had accomplished a great deal in so short a time.

Persons: Reva Byers, Gina Carter, Jim Duke, Mac Smith
 Date: 7-11 April 1966
 Destination: Ciudad Valles and surrounding area
 Reported by: Jim Duke

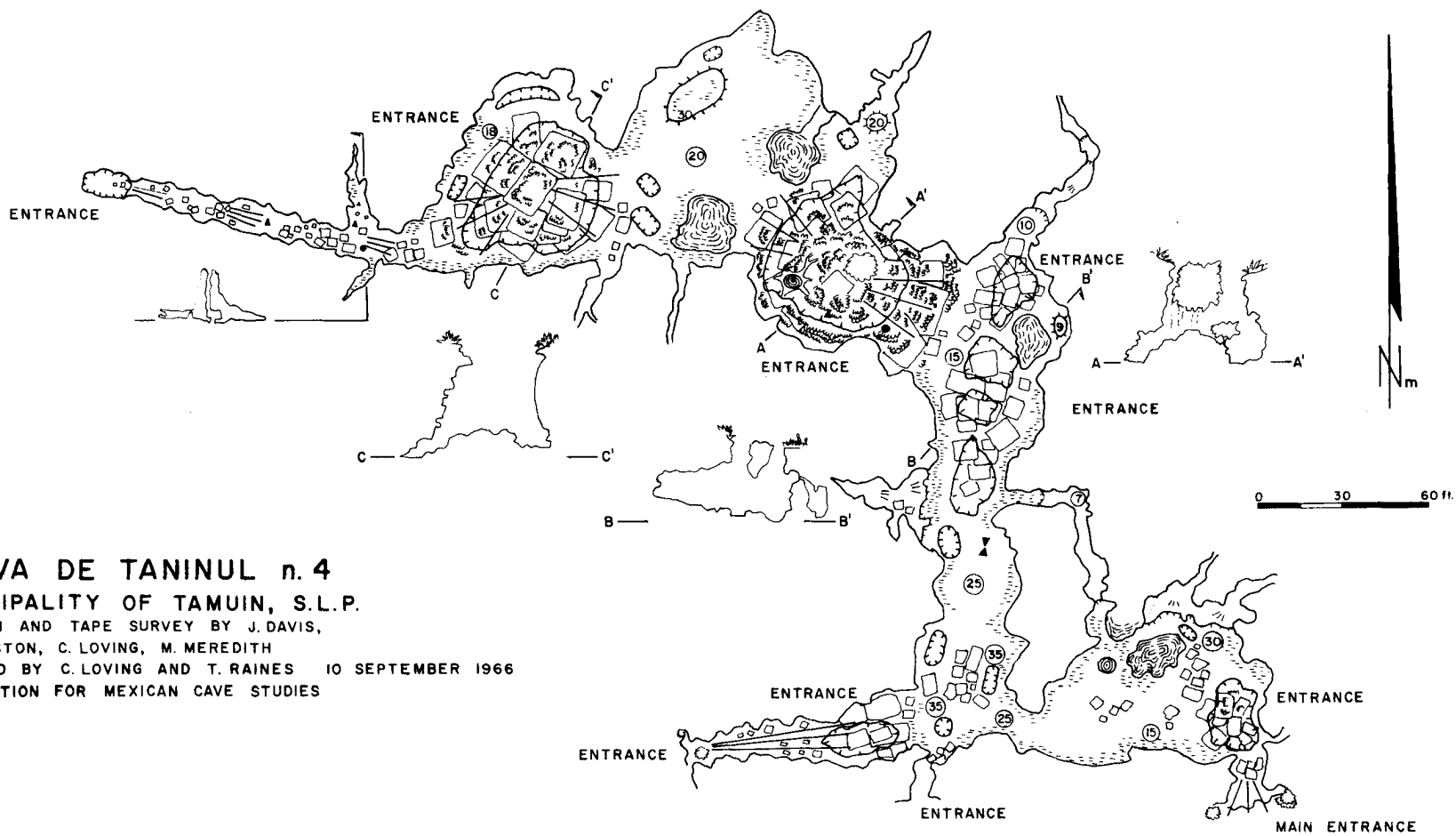
Somewhere around 5 PM on Thursday, approximately on schedule, we left Austin and arrived in McAllen, Texas at midnight. Here we ate at Jim's parents' house then continued on to Ciudad Victoria where we stopped briefly. From Victoria our destination was El Nacimiento del Río Frío, located just to the north of Ciudad Mante. (See AMCS NEWSLETTER, Volume I, Number 9, page 90.) We arrived shortly after another group led by Barbara Hershberger. With both groups combined, we trekked up to the cave, and after several attempts at speleo-photography we returned to the cars and the two groups split. From Río Frío we pushed on through Cd. Mante to Antiguo Morelos, where we headed west toward Nuevo Morelos, logging the road as far as kilometer post 197 before sunset. The demise of daylight forced us to abandon our efforts and head for Ciudad Valles, in hopes of meeting Charlie Loving and crew. The Lovings were not to be found so we camped by the highway just to the north of Valles near Los Sabinos. The next morning was a slow one and Valles finally faded behind us around noon as we headed west on Mexico Highway 86, toward Río Verde, road logging as we went. Roughly, the first 1/3 of this drive was through tropical vegetation, the second 1/3 was through rather common vegetation for a semi-arid area, and the last 1/3 was through barren country with sparse vegetation. There were many possible leads along the highway but those checked didn't go. At Río Verde we asked about caves in the area and were told that there are some just off the highway, but no specific directions were given. After eating supper we returned to Valles. There we met with the Lovings and crew and after conversation and refreshments, left on the highway north and spent the night again near Los Sabinos. Sunday morning we went on to Antiguo Morelos and continued the road log on west as far as Ciudad del Maíz. On the way back from Maíz we made a stop at Rob Blagg's ranch (an American rancher in the area) and a side trip to El Salto del Agua (El Salto Falls), both very enjoyable stops. A few other delays were caused by overheating of the car. From El Salto we headed for McAllen and then to Austin.

Persons: Faye Chapman, Jonathan Davis, Bill Johnston, Charlie
and Susie Loving, Marsha Meredith
Date: 7-11 April 1966
Destination: Ciudad Valles area
Reported by: Susie Loving Austin, Texas

We set out from Austin Thursday night and began the long drive toward the Cd. Valles area in Mexico. The purpose of our trip was to map some of the caves in the area and to gather information for the AMCS Bulletin. We arrived in Ciudad Mante about 7 AM and met the Hershberger's Volkswagen and declined their invitation to join them for breakfast. We were impatient to get to Cd. Valles since the early morning fog had cut into our time considerably. We arrived in Valles after 10 AM and ate at La Condesa on the main square. We decided to map Cueva de Taninul n. 4 first and then try to get into Cueva de Taninul n. 1. From Valles we took the Tampico Highway east. After a few miles we drove through a small pass, noting the railroad track to our left. Just after leaving the pass we parked the Land Rover on a dirt road, changed clothes in the brush, and walked back up the highway until we reached a small path just west of the railroad tunnel. Following this, we went up the side of the mountain and walked into Taninul n. 4 and began mapping. (For a description of the cave, see AMCS NEWSLETTER, Volume I, Number 4, page 36. A map accompanies this report.)

We left the cave about 4 PM and continued a quarter of a mile east on the Tampico Highway until we reached Hotel Taninul, a resort. There Charlie asked permission to enter Taninul n. 1, which is located behind the hotel and has a bar in its entrance. Since this was tourist season, permission was denied and we decided to try and locate Cueva Grande before setting up camp. We returned to Valles and headed south to El Pujal. There we received permission to enter Cueva Grande from Guillermo Martínez who owns the cave and also procured a guide for the following morning. We had understood that we would have to back-pack into the cave so we decided to make camp early in the evening and get lots of sleep for a big day ahead. Jonathan said that the Nacimiento del Río Coy would be a good place to camp and so we continued south on Highway 85 a few miles before finding the Río Coy. None of the Mexicans on the road, however, had ever heard of the Nacimiento and after going back-and-forth and back-and-forth several times until the Mexicans by the wayside started laughing, we gave up. We decided to camp on the highway in the first clearing we saw. This proved to be a road to a small Indian village and all night long people and dogs walked by our camp. Also, it was quite swampy and the mosquitoes made our night of rest very unsatisfactory.

As soon as the sun rose the next morning we cooked breakfast and packed our packs for the long trek ahead. At 8 AM we drove back into El Pujal to meet our guide. It turned out that we could drive almost to the entrance of the cave. We drove north on the highway around the first "S" curve and passed a wooden gate on the east side of the road. The next gate on that side is of wire. We went through it and followed the fence about a quarter of a mile and then turned left into the sisal field on



CUEVA DE TANINUL n. 4
MUNICIPALITY OF TAMUIN, S.L.P.
 BRUNTON AND TAPE SURVEY BY J. DAVIS,
 B. JOHNSTON, C. LOVING, M. MEREDITH
 DRAFTED BY C. LOVING AND T. RAINES 10 SEPTEMBER 1966
 ASSOCIATION FOR MEXICAN CAVE STUDIES

a rutted road. On the other side of the field the road ends so we headed out across a cleared uncultivated field, going north, and then turned east at the edge of the jungle until we reached a road going into the jungle. We followed this road to its end and we all got out while the guide led Charlie about 1/8 of a mile to the cave. Afterward, Charlie took the guide back to El Pujal and we followed the trail to the cave entrance. At the first fork you go right and all the forks thereafter you go left. (For a description of Cueva Grande see AMCS NEWSLETTER, Volume I, Number 4, page 36.) It took us all morning and a good portion of the afternoon to map the cave. After we finished we decided to go to Cueva Chica and look for some reported caves near it. We drove back to the highway and went south again and through the wooden gate on the east side of the highway as mentioned above. We drove down the dirt road to a stock pen, parked the Land Rover, and walked down to the cave. We did nothing in Cueva Chica except wash our faces in the lake a few yards in from the entrance. Then, we began searching the area for other caves, but after about two hours we decided that we couldn't find any. So it was back to Cd. Valles and a stop at a Pemex station to wash and change clothes. From the gas station we went to La Condesa for some food. There we met the Hershbergers again and later, Jim Duke, Gina Carter, and crew showed up. That night we camped near the highway again, north of Valles at the turnoff to Los Sabinos. The area here is much more suited for camping and we all got a pleasant night's sleep. The next morning we drove into Los Sabinos and asked permission to enter Sótano del Arroyo. The villagers told us that we must gain permission from Sr. Martínez in Valles, so we went to his house and talked to his son. His son wanted us to go to Tinaja and look for the crew who had entered the cave Thursday and were supposed to report back to him Sunday morning. We drove to Tinaja and reached the huge sink entrance just as they were beginning to load the equipment and start out. Tinaja had been finished except for one crawlway near the entrance and we were given the task of mapping it. At this point, Bill Johnston left our group and joined one returned to Austin that evening and we got Merydith in exchange. We picked up our gear and headed down into Tinaja.

The crawlway, which is along a bedding plane, is about 20 feet inside the entrance on the north side. For the first hundred yards it is a dry crawlway but then begins a very muddy water passage. We inflated the tire tubes and began mapping at the beginning of the water where Ed Alexander's survey had ended on a previous trip. Our progress was very slow and we soon began to get cold from sitting so long at the stations. The passage began to widen after the first bend and the water current became stronger as we continued downstream. At first there are mud banks, but as we progressed down the passage the banks became fewer and farther apart and the water got deeper. The passage averages 4 feet high and 15 to 20 feet wide. There are occasional domes about 10 feet high and as one continues, some reach a height of nearly 30 feet. About 900 feet from the entrance there is a fork in the passage. We decided to take the left fork and continued mapping. This passage was found to end after about 200 feet. Immediately before the end, though, there is quite a large room about 20 feet high and 50 feet in diameter. By this time Jonathan

was visibly blue and shaking and all of us were very uncomfortable so we decided to head out of the cave. Before we left, however, Merydith went a few hundred feet down the right-hand passage and reported that it continued on and was getting larger. Unfortunately, we had all lost our curiosity and decided to leave further exploration for another trip. We left Tinaja about dusk, and climbed to the top of the sink where we camped and ate community stew and then, slept soundly.

Monday morning we left Tinaja, locked the gate, and returned the key to Sr. Martínez in Cd. Valles. We then headed north to Austin, stopping at the Nacimiento del Río Frío to swim.

Persons: Bob Burnett, Ernest Garza, Ted Peters, Terry Raines,
Philip Winsborough
Date: 6-10 April 1966
Destination: Xilitla area
Reported by: Ernest Garza Corpus Christi, Texas

Wednesday evening, April 6, Terry loaded six persons and their equipment into his pickup truck and drove to Laredo where Ernest Garza, from Corpus Christi, joined the group. Two members of the party, Chip Carney and Don Erickson, were to ride only as far as Ciudad Valles where they planned to explore Sótano de Montecillos. (See previous report in this issue.) Customs presented but little difficulty, although the officials were amused at the mounds of equipment and at our purpose. Monterrey was the first stop, at 2 AM, for a snack to Terry's delight, "tacos de cabrito". Driving through the night, both he and Phil displayed excellent, although somewhat unnerving, skill in traversing the mountainous roads and avoiding cattle and cyclists.

7 April At noon we arrived at kilometer post 473, just north of Cd. Valles, where Chip and Don separated from the rest of the group. The remaining five of us proceeded to Cd. Valles where after lunch we started the road log to Tamazunchale. Much time was devoted to shooting photos along the road, as the jungle-like vegetation is a great source of wonder for one not accustomed to such lush growth. Reaching the end of the assigned log, we doubled back towards Cd. Valles as far as the small town of Huichihuayán near the Xilitla road turnoff. From here we forded the river and continued on west a few miles to the Nacimiento del Río Huichihuayán, where Terry suggested we spent the night.

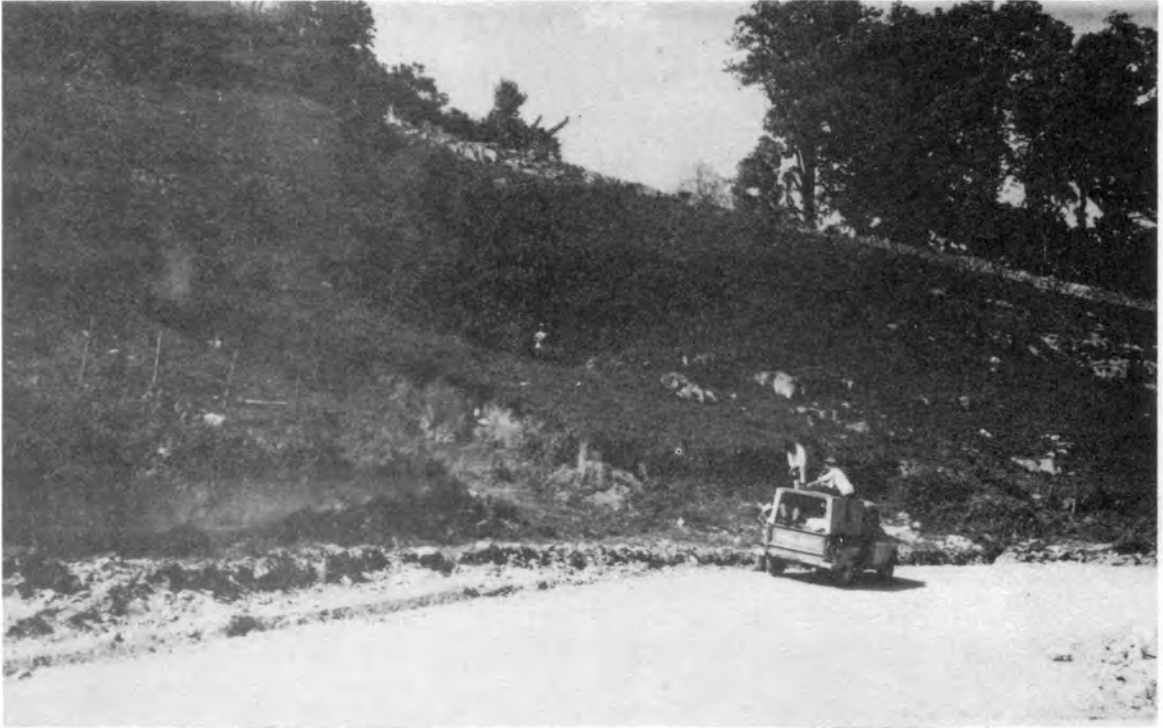
The place proved to be a beautiful camping site, well worth the rough ride required to reach it. Here the river emerges from underground and forms a wide circular pool within the weather-worn limestone. The vegetation was quite profuse; huge trees with trailing vines, and tropical plants are everywhere. The tranquil scene is further reflected by the picturesque view of native women, who get water at the pool's edge by carrying it in buckets balanced on their heads. That night we had a cool, refreshing swim, accompanied by a spectacular display of fireflies.

8 April In the morning, after breakfast, the log to Ahuacatlan was started. Following the old road to Xilitla, we investigated a large dolina which contained a cave and a sótano. Ted explored the sótano, which turned out to be small. Bob checked the cave and found it to be small also and contain an old pot and a few centipedes which were collected.

In Xilitla we were detained for a while by a religious procession going down the main street. We had arrived during the annual Holy Week observance. After this interesting diversion, the Ahuacatlan road log was finished. (See next page of pictures. In the bottom picture one can see that the road follows Arroyo Seco. The Arroyo at this point is relatively shallow compared to the gorge it cuts as it continues on to the east past Xilitla until its confluence with the Río Huichihuayán.) Returning back to Xilitla, we continued on to Tlamaya and Sr. Modesto Gómez's house. Upon arrival, we were greatly saddened by the news of his death in an automobile accident several months before. (See AMCS NEWSLETTER, Volume II, Number 1, page 9.) We learned that El Rancho de Huitzmolotitla is now owned by Ing. Rafael González Cisneros. The death of Sr. Gómez, along with that of Frank Harrison, is a great loss to members of the AMCS. Both were great men, always amiable to spelunkers.

That afternoon we explored a sótano (Sótano de Ortiga) near Tlamaya, located on a nearby hill covered with "ortiga" plants. The ortiga plant, sometimes called "mala mujer", is a very abundant in many areas of Mexico and is a very potent tree form of the stinging nettle. Terry whacked a path to the opening with his wingaro, a J-shaped blade with a handle at one end. A 180 foot rope was secured to a tree stump, and Ted was elected to descend first. He disappeared down the 25 foot in diameter pit and presently reported back that he had run out of rope and still had about 15 feet to go. He decided to jump, and landed on the soft rubble at the bottom. Another length of rope was added and Ernest rigged up, proceeding to his "baptismo en sótano" -- his first major vertical drop. It proved to be a blind pit, about 200 feet deep, with no side passages. Both cavers prusiked out using Jumar Ascenders; Ted rapidly climbing out first, Ernest taking half an hour (he was using ascenders for the first time). By the time we arrived back in Tlamaya it was dark, so we drove straight to the patio at the ranch where Bob brewed some of his special brand of stew.

9 April Saturday morning we decided to try and locate Cueva de Tlamaya, a reportedly horizontal cave in the village of Tlamaya. Shortly we found a guide who took us right to the cave which was only a few hundred feet from where the main road enters Tlamaya. We descended the 15 foot climbable entrance drop and found the cave to be much as Jim Moran had described it two years earlier. From the entrance you "enter a room 100 feet long, 50 feet wide, and 15 feet high and at the far left end of which is a pit dropping approximately 140 feet. At the bottom of this pit is a 40 foot circular gravel-floored room into which all the water drains and there are no leads". We found the description to be nearly correct except for the last part where Jim says the cave ends. By going through a short crawlway at the far end of the circular



Entrance to Sótano de San Antonio. Road material pit in foreground. Photo by Terry Raines



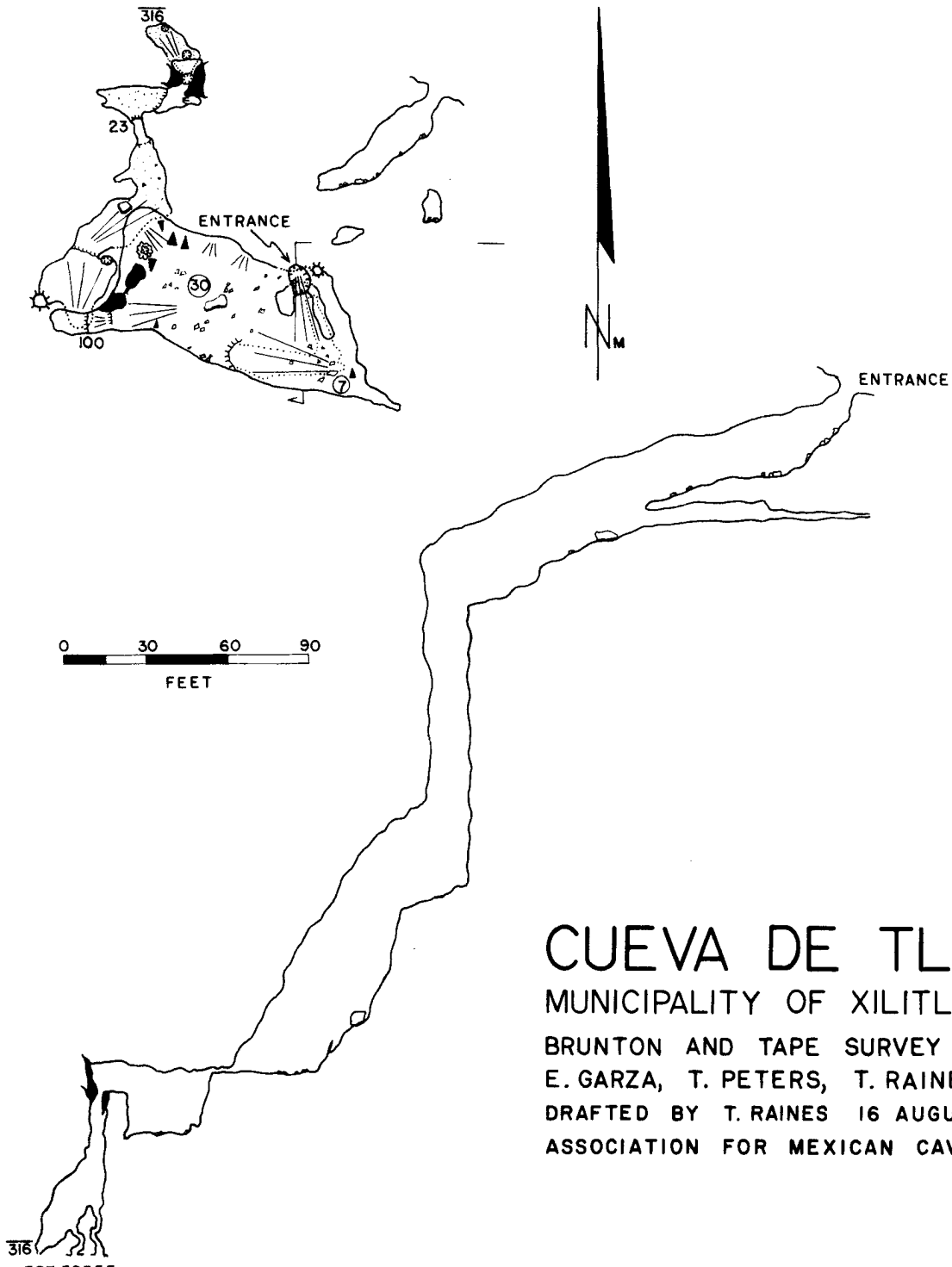
View looking north of upper end of Xilitla-Ahuacatlan road. Photo by Terry Raines

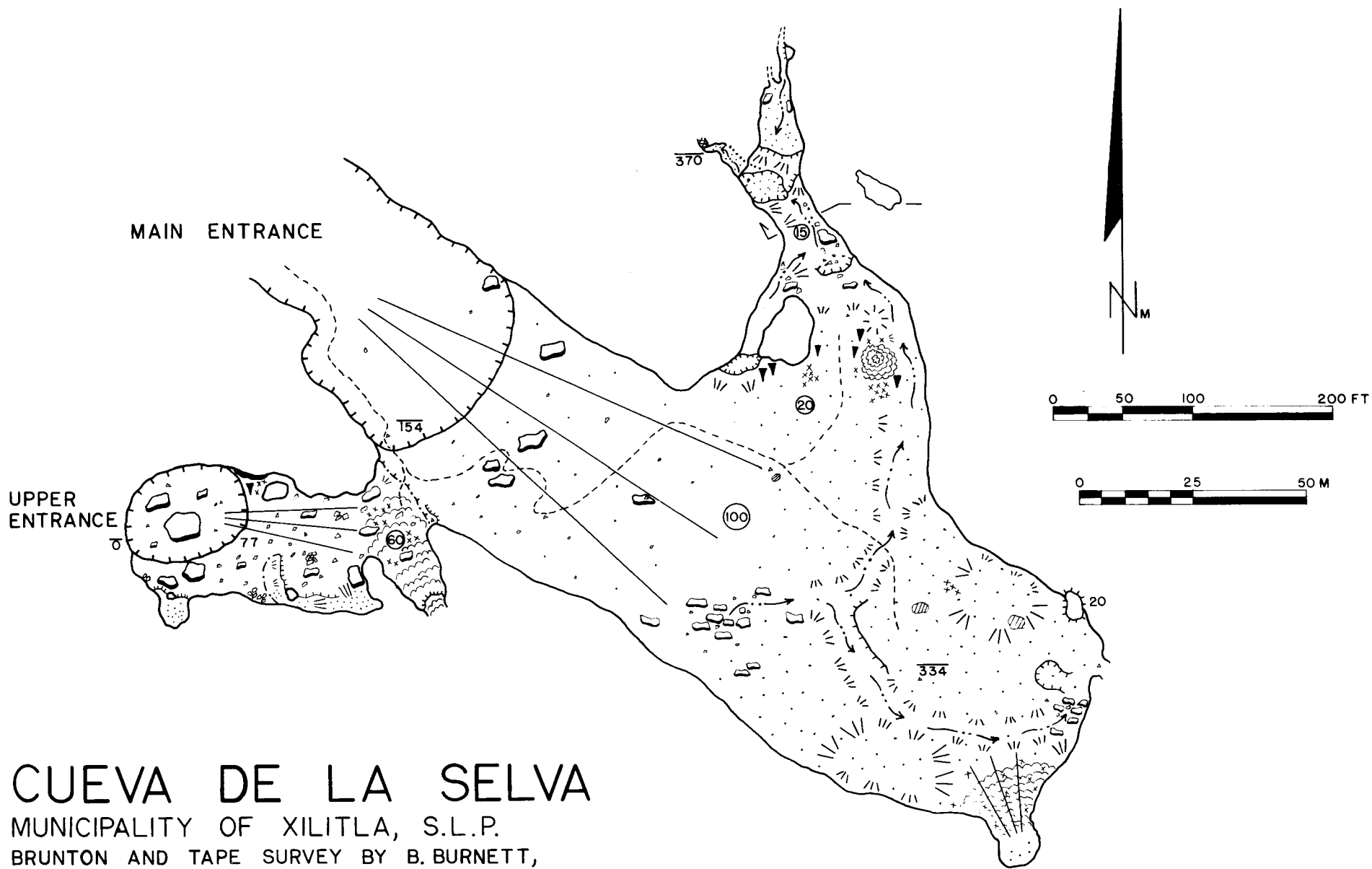
gravel-floored room Ted was able to climb down a 23 foot drop, continue horizontally for a short distance, then climb up to another drop. This last drop proved to be 37 feet deep and lead to three small pits. Terry made an heroic attempt to force them, even by taking his clothes off, but his efforts proved futile. Total surveyed depth of the cave is 316 feet. (See map.)

Time was getting short and we still had a lot to do. Next we were to map Cueva de la Selva located just west of Xilitla. We thanked the caretaker of Rancho de Huitzmolotitla, Sr. Ismael Larios, and drove toward Xilitla again. Our only pause was to gaze into Sótano de Huitzmolotitla, a truly spectacular sight: a vast opening surrounded by dense jungle, with many colorful birds fluttering about. (For a further description see AMCS NEWSLETTER, Volume I, Number 8, page 72.) Stopping in Xilitla to eat, we were amused by the sight of a huge neon-lit ferris wheel. It seemed strangely out of place in such a small town high in the mountains. Late that evening we made camp beside the road near Sótano de San Antonio, on the road west to Ahuacatlan. See top picture on the previous page.

10 April Early that morning we started the hike down to Cueva de la Selva. The cave was appropriately named (jungle), as there was abundant flora in the area. It forms a large opening within the mountain, almost 200 feet across, and a slope downwards into a huge dirt-floored room. A trail, used by local people to obtain water, leads into the cave to several pools. On the left wall is a series of solution tunnels of short duration. At the back of the room is a crawlway, which we did not map, that continues downstream for several hundred feet before becoming too small to negotiate. Near the Main Entrance, towards the right, was another short passage leading to the Upper Entrance. Just inside this passage Ted made a daring climb to check a suspicious hole at the top of a steep, almost vertical wall. It was all for naught, as he didn't find the hoped-for continuation. We finished our map of the cave and then started the hike back up to the truck. (See map of Cueva de la Selva on page 42.)

After stopping once more in Xilitla to eat, we then proceeded toward the Inter-American Highway via the new road, stopping a short distance from the town in the vicinity of Cueva del Salitre. Our purpose was to map the cave and explore a pit in the cave that F. Bonet had noted. (Dr. F. Bonet is a biologist with the Universidad Nacional Autónoma de México. In Boletín Número 57, of the University, entitled "Cuevas de la Sierra Madre Oriental en la Región de Xilitla", he describes 33 caves, no pits, and other speleological features in the Xilitla area.) Terry, Ted, and Ernest walked down the trail to the cave; it presented an even more impressive entrance than Selva. The cave consists of two tremendous rooms, floored with breakdown, that join by means of a short passage. The ceiling in both rooms is well over a hundred feet high. There is thick plant growth throughout the downward entrance slope as far as sunlight penetrates. The pit which Bonet noted and left unexplored is located along the right wall as one enters the cave. It was found to lead to the second room of the cave after an 86 foot drop. This room was almost equally as large as the entrance room and also





CUEVA DE LA SELVA

MUNICIPALITY OF XILITLA, S.L.P.

BRUNTON AND TAPE SURVEY BY B. BURNETT,
E. GARZA, T. PETERS, T. RAINES 10 APRIL 1966

DRAFTED BY T. RAINES

ASSOCIATION FOR MEXICAN CAVE STUDIES

contained a long, steep talus slope. There were many large blocks of breakdown which made traversing the room more difficult. At the upper end of the slope a short passage leads to a 66 foot drop, at the bottom of which is a dead-end room. Rope is needed to descend this 66 foot drop, but not the 86 foot drop. The latter drop can be avoided by climbing down the northeast end of it. (See map and pictures.)

Several hours were spent mapping the cave and afterwards our group headed on towards the Inter-American Highway, continuing the road log as we went. This new road which we were following is cut into the mountainside overlooking Arroyo Seco. It passes through some of the most spectacular scenery in the area and also through an area with some of the greatest cave possibilities as well. By dusk we had completed the log and paused at the Río Huichihuayán to take baths. Continuing on to Cd. Valles, we stopped only long enough to eat. The trip back was uneventful and we arrived in Laredo at noon Monday.

CUEVA DEL SALITRE

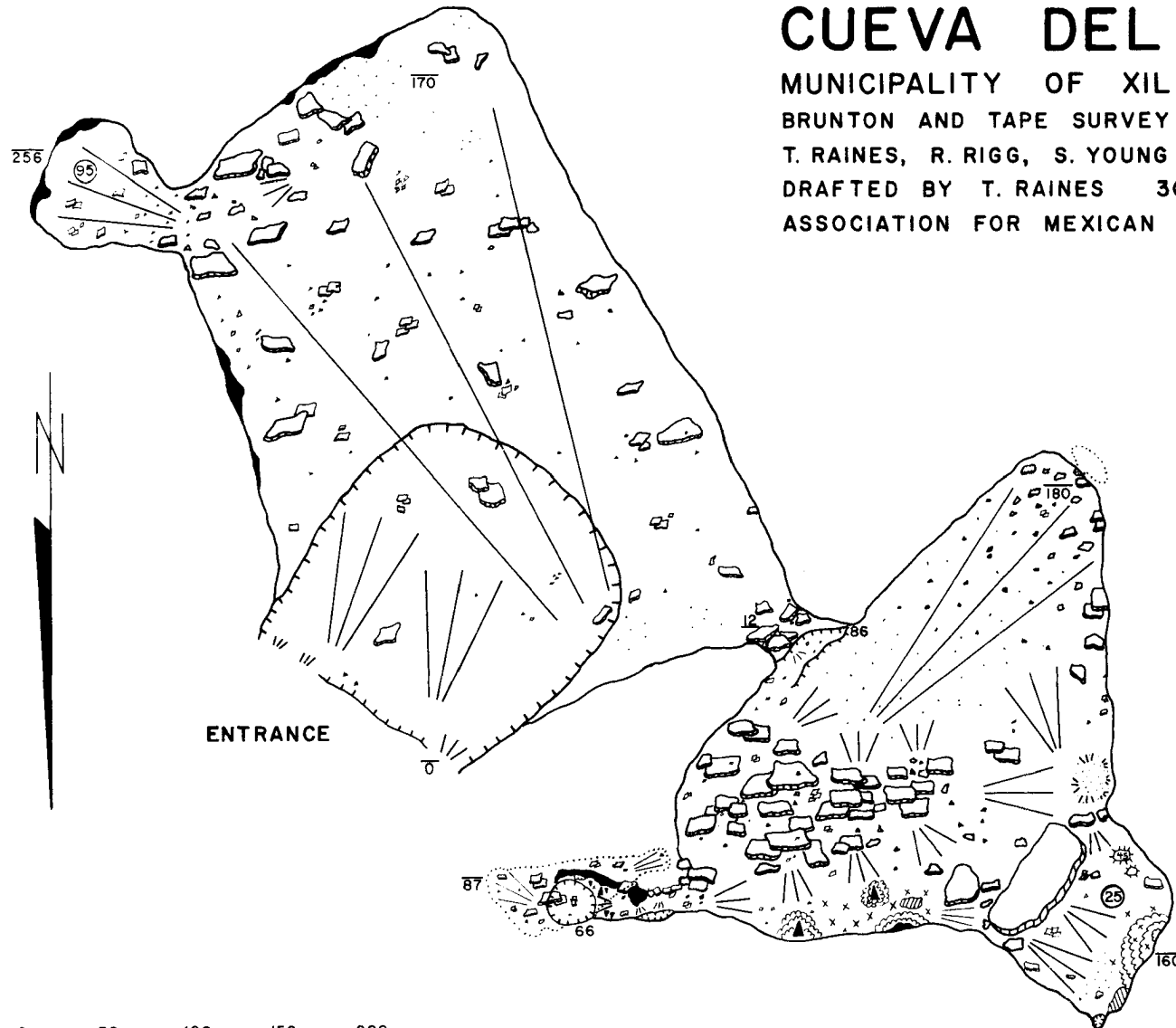
MUNICIPALITY OF XILITLA, S.L.P.

BRUNTON AND TAPE SURVEY BY E. GARZA, T. PETERS,

T. RAINES, R. RIGG, S. YOUNG 7 JULY 1966

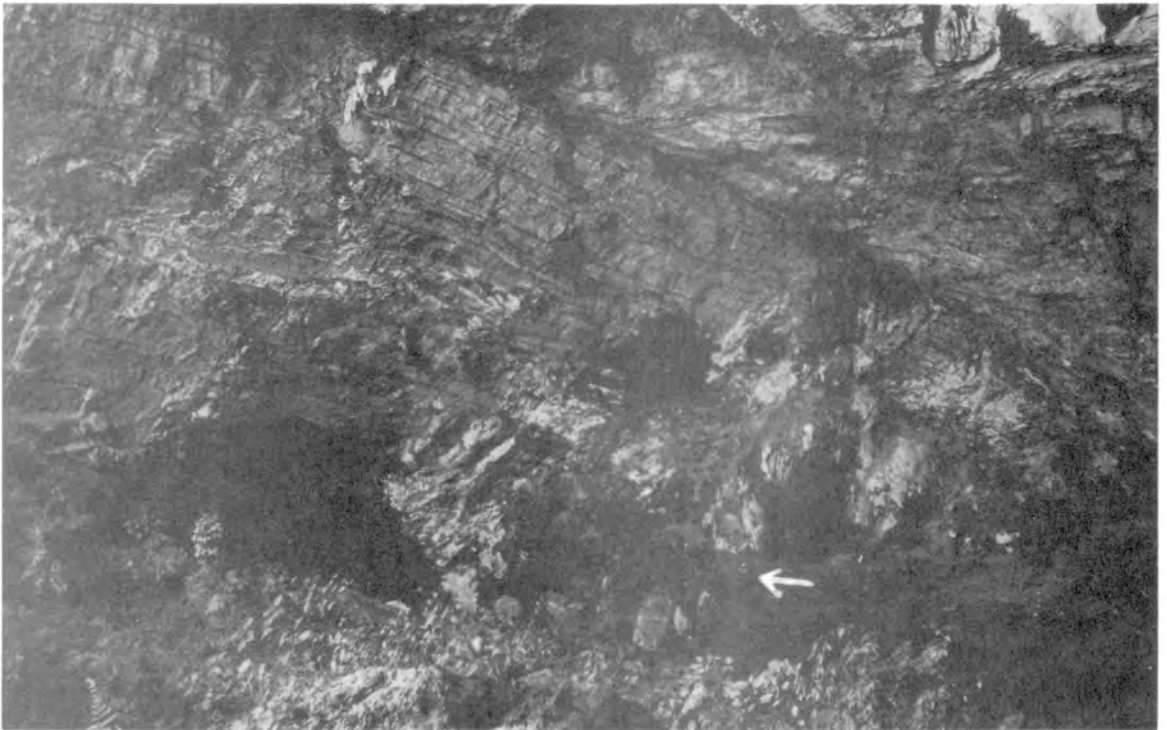
DRAFTED BY T. RAINES 30 AUGUST 1966

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Entrance to Cueva del Salitre.
Photo by Terry Raines



View across entrance room of Cueva del Salitre.
Photo by Terry Raines

MUSEUM OF ZOOLOGY — THE UNIVERSITY OF MICHIGAN
August 29, 1966

New Regulations covering Zoological Collecting in Mexico

Most museums and zoologists interested in field work in Mexico have doubtless heard of the new and much more stringent rules governing issuance of collecting permits. Permits must be obtained from the Departamento de Conservación de la Fauna Silvestre, of which Dr. Rodolfo Hernandez Corzo is Director General. The address is Aquiles Serdán 28, Piso 7^o, México 3, D.F., México.

Freely translated, the regulations are as follows: (1) Send application in ample time for action (allow at least two months), signed by the Director or Dean of the scientific institution in which you work; (2) state in full detail the research program you wish to pursue, and the intended use of the specimens to be collected; (3) state precisely the region(s) in which the work will be done, and the number of specimens of each species which you will need for your studies; (4) present yourself to the Delgado Forestal y de la Fauna in the state(s) where the collections will be made, for supervision and control of your permit and activities; (5) you must send a communication to the Agencias Generales del Ramo of the state(s) within which your itinerary will lie for your recognition and control; (6) restrict yourself to the activities and number of specimens allowed in the permit, in conformity with the bio-ecological situation of each region; (7) send to the Dirección General of the Departamento de Conservación de la Fauna Silvestre duplicates of the specimens taken, before leaving the country; (8) permits are for senior researchers only, and not for students or assistants; (9) send a report of the observations and conclusions resulting from your studies, preferably in the form of a scientific publication; (10) a fee of \$20 U.S. is charged for each permit, and two small passport pictures (2x2 in.) are needed for your credentials.

Collectors without permits who have been apprehended have been dealt with severely; a few have gone to jail. Any violation by an accredited institutional representative would result in blacklisting of his institution. Any foreigner must have a permit from the Port Captain to use any Mexican boat except pleasure craft, and such a permit will not be given to a zoological collector who does not have a collecting permit from either Fauna Silvestre or Pesca.

Clarification of the Regulations

Rigidly and literally enforced, these rules would make work in some groups almost impossible; they would also exclude thesis research by graduate students and make no allowance for competent investigators without institutional connections. Although directed primarily against commercial collectors they will make field work in Mexico more difficult for everyone, including Mexican citizens, to whom they also apply.

On July 12 I had an hour's interview with Dr. Hernandez Corzo, the results of which, at his suggestion, I am circulating. I wrote him on July 21 to confirm my understanding of what was said, but have had no reply. I believe the following interpretation of his statements to be correct:

1) The regulations apply to all terrestrial animals, including insects and other invertebrates; they do not apply to aquatic animals or to plants.

2) In groups in which field identification is not possible, the applicant should describe in detail what he wishes to do and specify the groups he will collect; he need not say how many specimens and of what species he will collect, nor send duplicates to the Departamento before leaving Mexico; but he must agree to send identified specimens and copies of all publications based on the collections later.

3) General collecting outside the group(s) for which the permit was issued, for the purpose of enlarging museum collections, is forbidden.

4) Graduate students who are working for the doctorate may be issued collecting permits if they are certified as such by the Chairman of the Department or Director of a Museum in the college or university where they are seeking a degree, and if responsibility for their actions is assumed by their sponsor.

5) The matter of competent amateurs was not discussed, but from the tenor of the discussion I believe they would need institutional sponsorship to obtain a permit.

T. H. Hubbell

The following letter was sent by Dr. Hubbell to Dr. Corzo and expresses well the objections to the strict enforcement of the new collecting regulations. The enforcement of these regulations would greatly hamper the biological work of the AMCS.

August 30, 1966

Dr. Rodolfo Hernandez Corzo
 Director General
 Departamento de Conservación
 de la Fauna Silvestre
 Aquiles Serdán 28, Piso 7^o
 México 3, D. F., México

Dear Dr. Hernandez Corzo:

I have sent the accompanying memorandum to all the principal zoological museums in the United States, and to a considerable number of zoologists who are not connected with museums, as you suggested. I hope that it is an accurate statement.

In conversations with both Mexican and United States zoologists I find that, although they recognize that abuses have occurred and approve of the objectives of the regulations, they are unanimous in believing that the rules as now drawn will have the

effect of greatly limiting the amount of research undertaken on the Mexican fauna. Restrictions that may be entirely reasonable as applied to birds and the larger mammals seem needless and rather absurd for such things as mice, frogs, insects, and other invertebrates, which occur in such numbers that no amount of collecting is going to reduce their populations, and in such variety that we are only beginning to know what is present. In such groups only extensive collecting is going to assemble the materials required for investigation, and often the combined collections of all the museums, made over many years by many collectors, scarcely suffice to provide the material needed for the study of a single group. Being myself an entomologist, I am particularly sensitive to this matter; a large proportion of the specimens of Gryllacrididae, which I study, were collected incidentally by people working on other groups of animals, and had such collecting not been done we would know very much less than the little we now know about Mexican gryllacridids.

I hope, therefore, that after due consideration the regulations may be made somewhat less onerous, and in particular that they be modified to permit general entomological collecting. Unless this can be done, I fear that faunal and taxonomic studies on the Mexican fauna will diminish greatly, to the loss both of México and of science.

Yours sincerely,
Theodore H. Hubbell
Director

The AMCS NEWSLETTER is published six times a year by the Association for Mexican Cave Studies, P.O. Box 7672 University Station, Austin, Texas 78712. Membership in the AMCS is \$5.00 for the calendar year, with memberships starting at the first of each year. Persons joining after the first of the year will receive all back publications for that year. Also, all back publications for the year of 1965 are still available by writing to the AMCS.

Members are urged to submit articles for publication. The article may cover any phase of Mexican speleology. Trip reports are requested from all trips.

Editor..... Terry W. Raines
Assistant editor..... John Fish
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THE ASSOCIATION FOR
MEXICAN CAVE STUDIES

NEWSLETTER

TRIP REPORTS

Galeana, N.L.

Sótano de la Tinaja, S.L.P. and Gómez Farías, Tamps.

Gruta del Palmito, N.L.

Huautla de Jiménez, Oaxaca

PRELIMINARY REPORT ON THE CAVES OF HUAUTLA DE JIMENEZ

RECENT PAPERS ON MEXICAN CAVE BIOLOGY

TRIP REPORTS

Persons: Orion Knox, Jr., James Reddell, A. Richard Smith
Date: 1-7 June 1966
Destination: Galeana, N. L.
Reported by: James Reddell Austin, Texas

We left Austin about 3:00 PM and drove to a gravel dump south of Monterrey where we spent a restless night in the lowland heat. We awoke early and, after a good breakfast, drove west from Linares to Galeana, stopping frequently to take pictures and admire the geology. Arriving at the turn-off to Galeana about noon we turned south and drove on towards Doctor Arroyo, stopping several times to inquire about caves. Having no luck we continued south to an area of sinks south of the village of Santa Fe. Orion and Mills Tandy had noticed these on a previous trip through the area. (For trip report see AMCS NEWSLETTER, Volume II, Number 2, page 24-25.) The sinks proved to be of considerable interest, as most were formed entirely in a gypsite "dirt". (See picture on page 50.) Some of the sinks were quite large, being 50 to 100 feet in diameter and up to fifty feet deep. Although the majority were dead-ends, a few led to small caves and two were of more interest. One of these was reached by a large sink, from the wall of which a circular walking solution passage in "dirt" led for about 70 feet to a pit dropping 15 feet to a ledge and then after a 10 foot drop into a room 40 feet long, 20 feet wide, and 35 feet high. A mass of recent and unstable breakdown covered a pit in the floor. This was a fissure in gypsum dropping about 70 feet to a dead-end. The total depth of the cave was about 130 feet. The other cave of interest was located in the same shallow depression and consisted of a 100 foot in diameter sink 70 feet deep and requiring a handline to enter. At the bottom of this huge dirt collapse a hole in the dirt at the bottom led into a gypsum fissure requiring rope to enter. No passages led from the bottom, a total of 170 feet from the top of the entrance sink. After exploring these two caves we hiked over to what promised to be other sinks against the base of a line of gypsum hills. Although these proved to be filled one small cave was found in the hillside and several large sinks were located in the hills. One of these was at the bottom of a large depression and, though in dirt, looked very promising. After checking these and other dead-end sinks we drove back to the Galeana turn-off where we drank many Coca-colas and ate supper. From here we drove on to Galeana and from there to the Pozo de Gavilán. (See map on page 51.) Our first sight of the Pozo was impressive, but for a little luck we might still be there. As we drove up, being very careful to miss a shallow sink ahead of us, we came within inches of driving into a three-foot in diameter undercut 10 foot deep hole on our left.

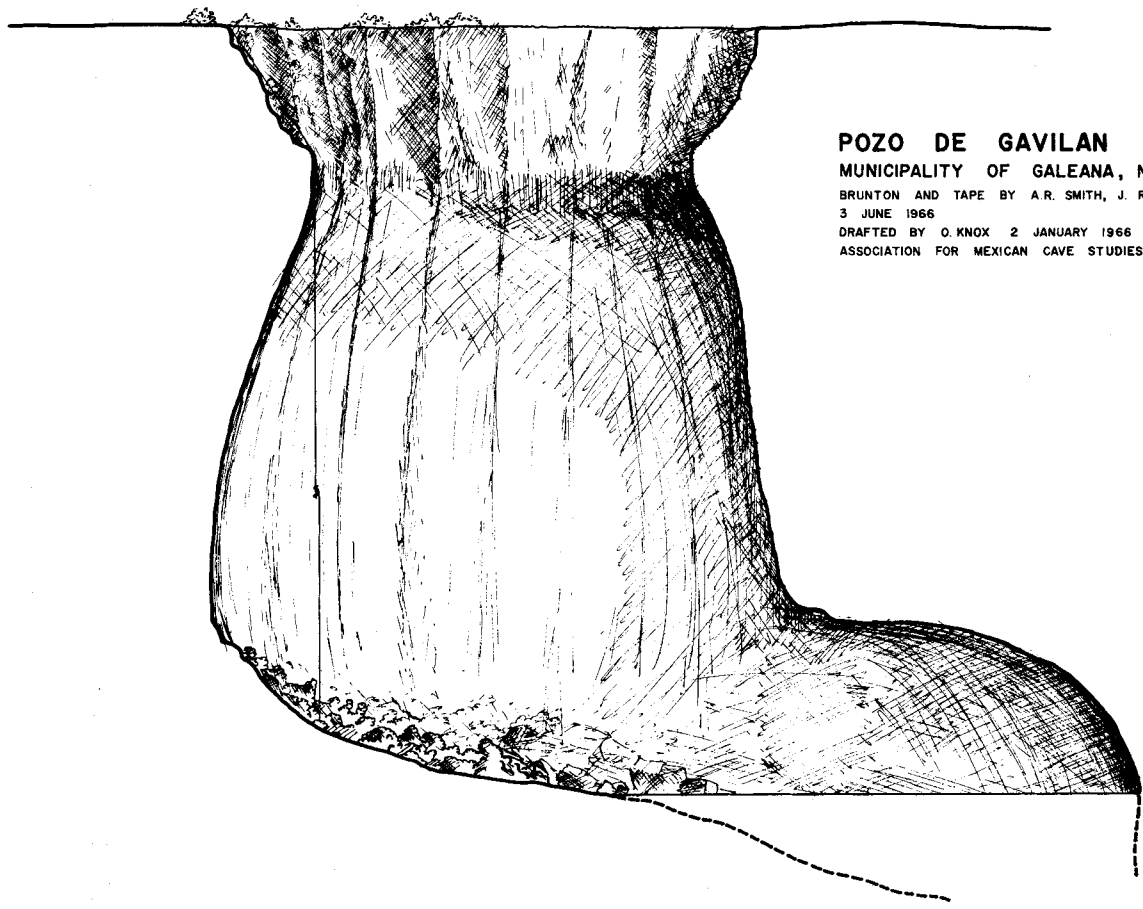
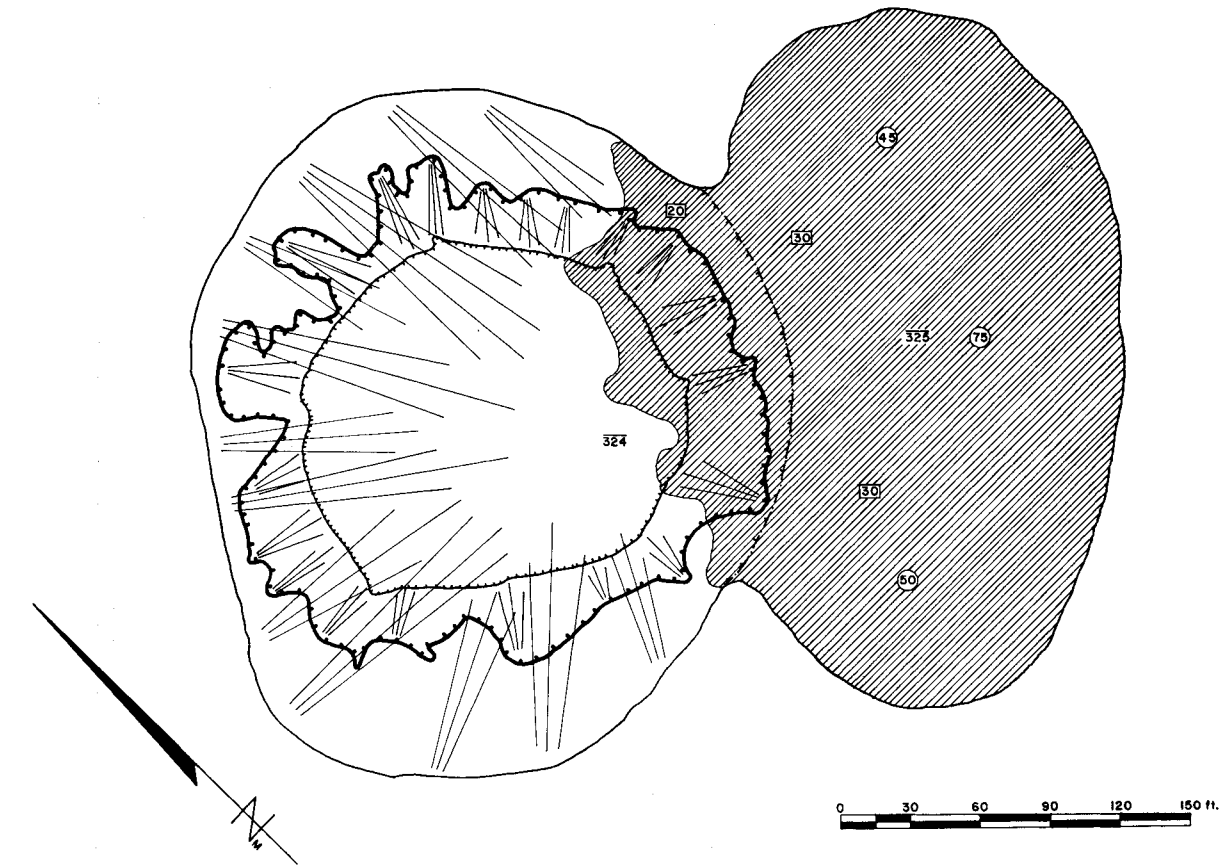
The next morning we awoke after a very cold night and immediately rigged the entrance to the Pozo. While Orion rappelled in, Dick and I surveyed the entrance, which proved to be 670 feet in circumference and 200 feet by 190 feet in diameter. On one side it drops 285 feet, while on the other it is about



One of the many Santa Fe dirt sinks located to the south of Galeana. Photo by Orion Knox



The large depression surrounding the entrance to Sumidero de Pablillo. Photo by Orion Knox



POZO DE GAVILAN
 MUNICIPALITY OF GALEANA, N.L.
 BRUNTON AND TAPE BY A.R. SMITH, J. REDDELL, O. KNOX
 3 JUNE 1966
 DRAFTED BY O. KNOX 2 JANUARY 1966
 ASSOCIATION FOR MEXICAN CAVE STUDIES

330 feet. At the bottom along one side a deep beautiful blue lake extends about 180 feet beyond the lip of the sinkhole, but no passages were found to lead out. While Orion explored the cave Dick and I hiked around looking for other leads. Along the edge of a steep hill we found an extensive area of gypsum sinks and fissures, but none were found to be of any extent. More impressive was a narrow gorge about 150 feet deep which had been cut straight down through the soft gyps site and rock of the valley forming vertical walls. This gorge eventually empties into a beautiful lake, the Laguna de Laboradores, but time did not permit our visiting the lake. Reportedly after a heavy rain a whirlpool once formed in the lake and dragged a boy down to his death. The lake is apparently a filled sinkhole. From the Pozo de Gavilan we drove on north to the Puente de Dios, where we spent the night. (See AMCS NEWSLETTER, Volume I, Number 12, page 116.)

After spending a pleasant night we awoke and while Orion climbed down to the river for a bath Dick and I went to the top of a beautiful 150 foot waterfall which drops down to the river just downstream from the Puente de Dios. We spent a pleasant hour or two walking up the stream to its source and then climbing out of the stream bed and walking back down the road to the Puente. Leaving here we drove on south to the Galeana turnoff where we met David McKenzie and group just arriving from Austin. We joined forces and drove on south checking small sinks along the way. All dead-ended, but at Santa Fe we again stopped and Orion, David, and Jim Wyler carried 300 feet of rope up the hill to explore the deep dirt sink we had discovered two days earlier. While they were doing this Dick and I walked over the countryside looking at other sinks. One of these was a 70 foot in diameter, 120 foot deep undercut sink with no apparent leads from the bottom. We did not enter it, however. The deep dirt sink which the others were exploring ended after 227 feet of misery and we drove on south to Pablillo.

Here a few inquiries led us to the Sumidero de Pablillo. (See picture on page 50.) Pablillo is located in a broad valley, from which a wide dirt-floored draw about 40 feet deep leads to end against a high cliff of gypsum. Two cave passages extend from this broad sink, one dropping vertically while the other extends straight back into the cliff. Both connect after about 100 feet. The lower passage continues for about 300 more feet to end in a low silted crawl containing bad air. That night the thermometer dropped to 32°, indicating summer is the best time to visit this area.

The next morning we separated from David and his group and while they drove south to Doctor Arroyo we first visited a spring to replenish our water supply and then drove back towards Galeana. Our first stop was at another dirt sink on the east side of the highway. This sink proved to be a 50 foot in diameter sink climbable for the first 40 feet but then dropping undercut into an impressive dirt room about 40 feet in diameter and 50 feet high. The rope cutting into the steeply undercut wall made Jumar Ascenders a very welcome aid.

After exploring this sink we drove west and north to Arteaga where much inquiry about caves led us to believe that the only cave of any consequence in the area is Gruta de Cueva-cillas (see AMCS NEWSLETTER, Volume I, Number 7, page 68). We did not care to make the long climb up to the cave so we decided to continue east on a good gravel road. After several miles we came to a junction. Taking the left fork we stopped at the base of a 300 foot hill near the top of which we could see what was an obvious cave entrance. Gathering up our gear we climbed up to the cave, which proved to be a mine apparently excavated along a previously filled cave passage. Small solution domes and alcoves gave evidence of the existence of the original cave, but in general it was uninteresting and only 210 feet long. Two cave crickets were taken in the cave and one Rhadine seen, so it was of some biological interest.

From here we continued to drive east in the hope that we could cross the mountains to reach the highway to Monterrey. Inquiry indicated that a road, though poor, did exist, so we drove on. The farther we drove, however, the worse the road became and the less encouraging local reports on road conditions. Finally a horseman told us that the road was impassable beyond the next village. We drove on still farther, however, and finally reached a high beautiful pass at the top of the mountains. Below us we could see a spectacular canyon dropping to the east, but the road was already bad and we knew that if it got worse we would be out of luck. A pleasant night was spent here.

The next morning Orion departed at the crack of dawn to climb the nearest mountain, so Dick and I slept a little longer and then I proceeded to make a few collections in this relatively unknown area biologically. When Orion returned we packed the car and headed back towards Arteaga. From Arteaga we drove on to Saltillo and then to Grutas de Villa de García where I hoped to do some collecting. The manager wasn't there so we had to pay to get in, but the guide very generously let us have the run of the cave for as long as we wanted. A couple of hours were spent scouring the cave for life, but only a few animals could be found. Some of the best areas for collecting have been destroyed by commercialization and apparently most of the previous collections were made before the cave was opened.

After returning from our trip to García we ate lunch and drove on that night to Cueva de Carrizal which none of us had seen. Although it was reported to us that the pavement was completed to Candela, we found this not to be the case and that the last few miles were very definitely not paved. None of us having been to the cave, we were rather uncertain as to where to go and so when we discovered ourselves in the middle of the desert and not where our directions said we should be, we pulled over to the side of the road and spent a hot, mosquitoey night. We arose with the first rays of the sun and soon found the right road and drove on to the cave.

We found the water in the cave a more than welcome relief after many hot hours in gypsite sinks, deserts, and dusty mines. A small collection in the upper entrance room produced a new

species of milliped of a group not previously found in this area and two species of camel cricket, neither of which had been taken in the area. Our visit to the cave was, therefore, well worthwhile, and our baths made the long hot drive back to Austin bearable. Leaving the cave about 11:00 AM we arrived in Austin sometime after dark.

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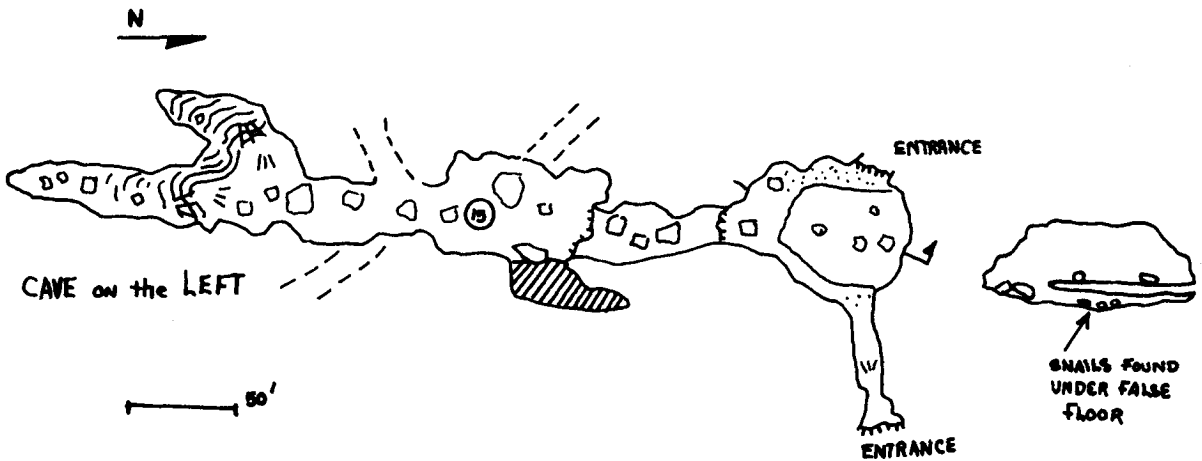
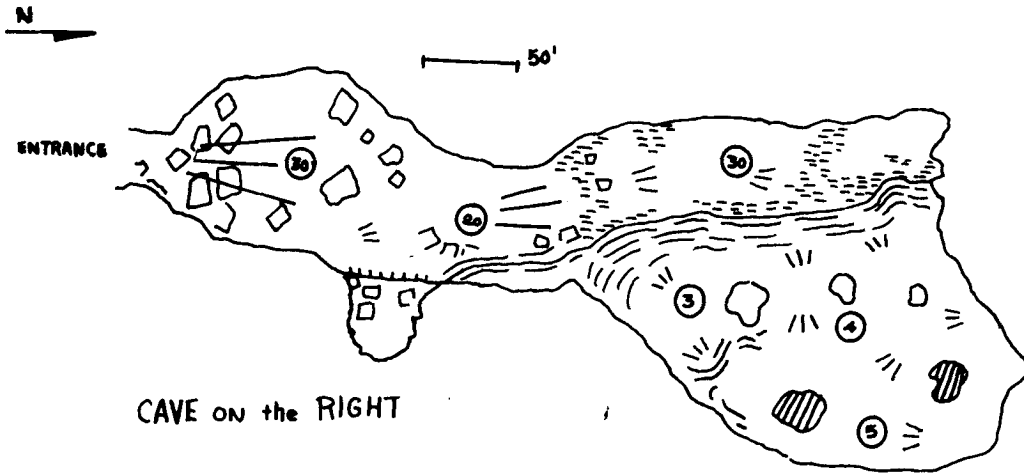
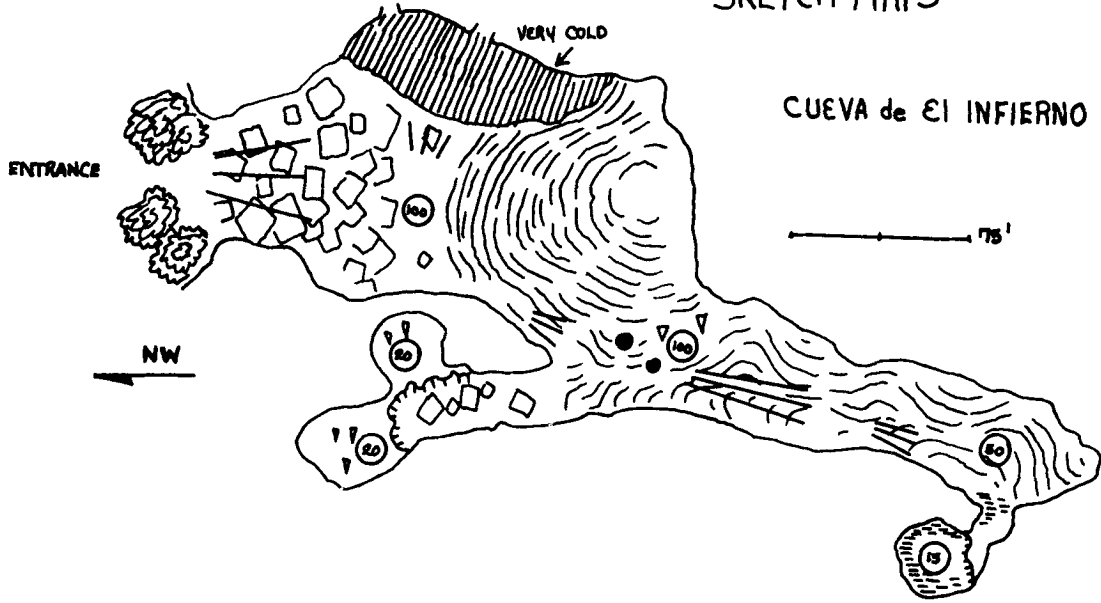
Persons: Bill Johnston, Charles Loving, Dennis Sustare,
Merydith Turner
Date: 30 May-4 June 1966
Destination: Ciudad Valles, S.L.P. and Gomez Farías, Tamps.
Reported by: Dennis Sustare Austin, Texas

May 30, 31, and June 1 were spent exploring the water passage in Sótano de la Tinaja, which is reached by a crawlway leading off near the entrance. Mapping was continued from the junction, along the right-hand passage. Although blind fish are found in the water up to the junction none were sighted along the stream or in pools beyond this point. The passage continues along a major crack system leading nearly due north for several hundred feet. Then it makes a slight change of direction to go somewhat more easterly at a dome room. After another length of passage that gradually opens into walking height the passage suddenly opens on a double pit room with the pits connected under a small natural bridge. The pits drop about 20 feet and have a soft muddy bottom. A traverse along the side of the left-hand pit leads to a small crawlway which in turn leads to a small room. By crawling down one of several twisting holes in the floor one comes out into another room with beautiful white travertine dams and crystal-clear water in the bottom. A series of rooms half-filled with water leads back to the south while two narrow passages lead off from this room to the north. A chimney and climb is required to continue along these passages. We mapped to this point and then left the cave.

June 3rd we drove to Gomez Farías and continued on up into the mountains, taking the left road at the turnoff to Rancho del Cielo. Continuing up a very bad road we eventually arrived at San José, a small logging town. We went to look at one cave near the town called El Infierno. It has a large, attractive entrance with an extensive mound of flowstone in the center of the entrance room. There are essentially no passages leading off from this room. A pool in the cave contained very cold water and no life was seen in it.

Driving on beyond San José the next day, the road became extremely bad. After passing a small town called La Gloria one comes to a fork in the road. To the left the road leads to an area where sótanos are said to be found. We took the right-hand fork, which led through several areas rich in sinks, and climbed further to another logging camp, Cuevacillas. Two caves are found beside the camp, one on either side of the road. The right-hand one is not large, but has numerous invertebrates within it. The left-hand cave is more extensive, with a

SKETCH MAPS



MAPS DONE FROM MEMORY BY Charles E. Hoving

secondary opening one-third of the way through it. This room has a large shelf of rock for a floor, under which are many snails. Further into the cave is a large population of millipedes and a small bat colony. None of these animals were collected.

The loggers in Cuevacillas know of numerous other caves and pits in the area, and more exploration should be done here. The vegetation is very lush, including high pines, large ground ferns, and cycads. Due to the poorness of the road it would probably be better to reach Cuevacillas in the other direction, from Ocampo.

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Persons: Roger Albach, Phil Meredith, Don Riley, Bob Smith,
Dick Thomas and son, Merydith Turner, Jim West
Date: 25 June 1966
Destination: Gruta del Palmito Bustamante, N. L.
Reported by: Merydith Turner Austin, Texas

The above persons, members of the Río Grande Valley Caving Club (centered in Weslaco, Texas), intended to make a day trip to Bustamante and check the roads heading due west from Roma, Texas to Sabinas Hidalgo, N. L. We met about 6:00 AM at customs in Ciudad de Miguel Alemán.

A well paved highway, Mexico 30, leads west from Ciudad de Miguel Alemán to Mier, then south and west to Monterrey. After inquiring, we learned that the way from Mier west to Parás was unimproved and the area had received much rain. So we continued southwest on Mexico 30 to General Treviño from where a good paved road returns north through Agualeguas to Parás. In Parás we learned from an American rancher that although part of the road to Sabinas Hidalgo is paved, and some is graveled, the rest is only graded. For this reason it is rather a pickup road even in dry weather and with the rain, probably impassable.

Somewhat disappointed that our shortcut didn't pan out, we turned back and had to go all the way to Monterrey and then north again to Sabinas Hidalgo on Mexico 85. For one who has in his many visits, over a number years, always seen Bustamante as a dry clear desert area, the sight that greeted us was indeed strange. This north-south trending valley and its confining mountain ranges were overcast with high gray clouds. At a lower level the wind was piling dark heavy clouds against the mountain tops of the west range where Gruta del Palmito is located.

Reaching the far side of town at 2:00 PM we found the ground too soft, so we began to walk in the intermittent rain. To anyone who has ever been there, can you imagine the dry gully which runs out of the canyon to be a rushing creek of clear, clean water? At a late 5 PM, with water running in the entrance making the slope very slippery, we decided not to enter the cave but to begin the return trip.

Subsequent trips have found much more water than normal in

the cave. The spring was running strongly and some travertine pools that have been dry for five years are now full.

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Persons: Ed Alexander, Bob Burnett, John Fish, John Kreidler,
Charlie Jennings, Tommy McGarrigle, Bill Russell

Date: 31 May-10 June 1966

Destination: Huautla de Jiménez, Oaxaca

Reported by: John Fish Austin, Texas

Ed, Bob Charlie, and I left in my car late on Tuesday afternoon, bound for the fabled Huautla plateau in northeastern Oaxaca. Bill Russell, John Kreidler, and Tommy McGarrigle got a late start and joined us in Huautla. Despite the many traumas of our drive to Huautla (hole in the gas tank the size of a nickel-repaired with a Tootsie Roll, fog along the mountain roads), we arrived there at last only to have to wait a day in Huautla while I recovered from a severe intestinal infection. Bill Russell and group caught up with us and after putting Felix Seiser (visiting from Austria and had come with Bill) on the bus back to the U.S., we drove on to the cave area which starts about three miles east of Huautla. On June fourth we got our first look at the cave country we were seeking.

We had planned to drive to the end of the road and camp, but after passing several large sinkholes, everyone abandoned their cars and started checking the sinks near the road. Upon questioning the local people, Bill was directed to the bottom of a large closed valley in which a small stream dropped into a pit about 250 feet deep, later named Sótano de San Agustín. The small town of San Agustín (hence the name of the sótano) lay 500 feet above the sótano in a divide between two huge dolinas. The San Agustín dolina is approximately one mile long and up to a quarter of a mile wide. It consists of a large central dolina with several smaller dolinas or sinks at each end below the towns of San Andrés and San Agustín. The Río Iglesia dolina appears to be larger, perhaps the same length but considerably wider and deeper. In both dolinas water runs off volcanic hills or ridges and sinks into the limestone dolina bottoms.

Looking down from San Agustín we could see where the Río Iglesia dropped into a fissure below a large opening in the mountain. That afternoon Bob, Ed, and Charlie explored the entrance drop of Sótano del Río Iglesia and found that the main water passage, which took several hundred gallons per minute, was impassable. An overflow passage was easily accessible, though, and led to a drop. Since it was virtually dark we decided not to push the cave then.

Meanwhile Tommy and Bill both spotted a large entrance near San Agustín on the hill above. This was subsequently called Cueva de San Agustín and goes down a series of slopes and drops to a deep pool of water. The cave appears to continue.

After a perusal of our topo maps the next morning, we decided to look over the area in general. (A section of the topo map used is found on page 60.) In particular we wanted to go to Ranchería de Camerón, located along the southern flanks of the plateau, where a closed valley is shown. As the rest of us began our hike, Bill, Tommy, and John Kreidler headed along the NE trending closed valley to Tenango, several kilometers away. We found immediately that our topographic maps were incorrect in many details, especially relating to culture, so we made corrections as we went along. Many of the Indians which live in the isolated mountains speak only Mazatec, and at times communication was frequently a problem. We found Camerón that afternoon and discovered that the large valley became narrow and deep in a direction away from the plateau. It passed down a series of drops then between three hundred foot high sheer limestone walls and finally emptied into a broad valley below. Greatly disappointed, we began the long eight kilometer hike back to camp. Except for the few caves found in the large San Miguel dolina (see cave descriptions), we found no pits or caves on the southern flanks of the plateau (this day) other than a few shallow, filled sinks. On the other hand Bill Russell and crew found several small sótanos, most of which were left unchecked, and a large cave with a stream entering it. The cave, Cueva de Agua Carlata, was explored as far as the twilight penetrated, about 200 feet below the entrance. A large passage containing a good-sized stream led downward into darkness. They returned to camp having only partially observed the large valley containing the village of Tenango.

The morning of June sixth we decided to check out the sótano just below our camp, Sótano de San Agustín (see description). Although it was only a few hundred yards away, it took two to three hours to tie the rope off, and for Bob, Charlie, Ed, and Tommy to hack their way down the vegetation covered entrance drop. The entrance is a pit as large as that of Sótano de Huitzmolotitla, but not quite as deep. From the bottom a high fissure slopes steeply downward into a big room, where another stream emerging from breakdown joins that from the waterfall at the entrance, making it comparable to the stream of Río Iglesia. Ed and Bob continued onward and found that after a series of short, closely-spaced drops, they had used all of their rope and not yet reached the bottom. From the top of the next drop water could be heard falling and splashing far below.

Since there already were enough people in Sótano de San Agustín, Bill, John, and I decided to check out what from a distance looked like a very promising pit. Much to our surprise, it turned out to be a cave later named Millipede Cave (see description). From this cave we got our only good collection of the whole trip, then returned to the car.

On June seventh, our last day at Huautla, we devoted the day to a reconnaissance of the nearby areas of the plateau. As it was about a ten kilometer hike one way, and we were at times uncertain of the trails, we hiked only to the edge of the plateau. Among the features we saw were haystack hills,

sinks, a large dolina about two miles across, and a pit that Bob found in which rocks fell free for five seconds, bounced, and fell five more seconds before hitting bottom. Another important cave (to us anyway) was a little spring we found at the edge of the plateau, which replenished our water supply.

Back at the car we packed our gear and grudgingly left for Austin and then the NSS Convention at Sequoia National Park in California. After spending a night on the road with flat tires (both cars had flats) we drove into Tehuacán. The gas tank was repaired and the two cars parted company. Bill Russell's group stopped briefly by the gypsum area near Galeana then continued on to Austin. Bob, Charlie, Ed, and I visited a meeting in Mexico City of the Club Exploraciones de México, where we showed slides of the Gomez Farías area and discussed caving. Following a rumor of a 250 meter deep pit near Taxco called Pozo Melendez, we found it to be only 320 feet deep (a map will appear in a later report on the caves of Guerrero). The cave was later found to be reported in an old NSS NEWS. We then headed for Austin, car trouble and all. It was a trip that will long be remembered by those who participated.

PRELIMINARY REPORT ON THE CAVES OF HUAUTLA DE JIMENEZ

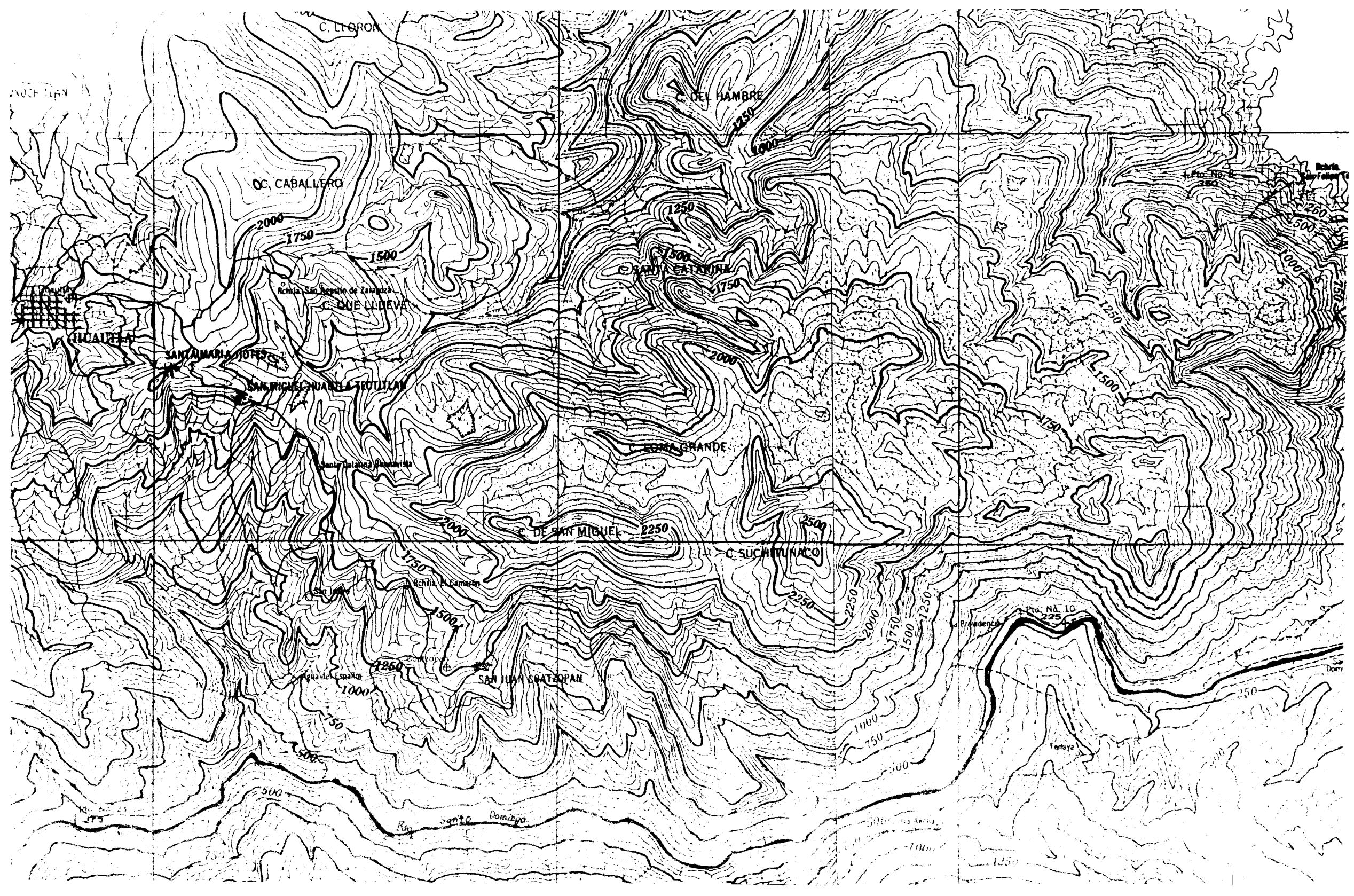
by John Fish

Bill Russell

This report is a compilation of the information collected from the June 1966 trip to the Huautla area by AMCS members. (For further information see Huautla area report and the following trip report in the July 1965, AMCS NEWSLETTER.) The two trips were essentially reconnaissance to learn more about the area and its potential. This has been only partially achieved because of the large territory involved, but needless to say, the speleo-potential is tremendously good. Because of the nature of the trips, no caves were mapped. A sketch map of part of the region was made, and several caves were either partly or wholly explored.

The road to Huautla is traversable by truck; it is presently being extended beyond the point shown on the area map to the town of San Felipe Jalapa de Díaz. Also, another road is being built from the small town of San Jeronimo to Huautla, which will make the area northwest of Huautla more accessible.

A topographic map is included in this report as an aid in locating caves, and for future trips to Huautla. It is a partial copy of two maps (the Huautla 14Q-1(11) and Tierra Blanca 14Q-1(12) quadrangles) produced by the Secretaría de la Defensa Nacional. It was these maps that were the first to indicate that the Huautla area contained large, deep cave systems. The contour interval is 250 meters between heavy lines. In general the topography is reasonably accurate, but the culture is more frequently wrong than correct. Villages are often mislocated, and the names of villages as well as physiographic features are often different from those used locally.



C. LLORON

C. DEL HAMBRE

C. CABALLERO

C. DE LA DEVA

CHIAUTLA

SAN MARÍA TUPES

SAN MIGUEL HUANEL TROTILAN

C. LOMA GRANDE

C. DE SAN MIGUEL

C. SUCHITUNACO

SAN JUAN SOATZOPAN

Pto. NA. 10

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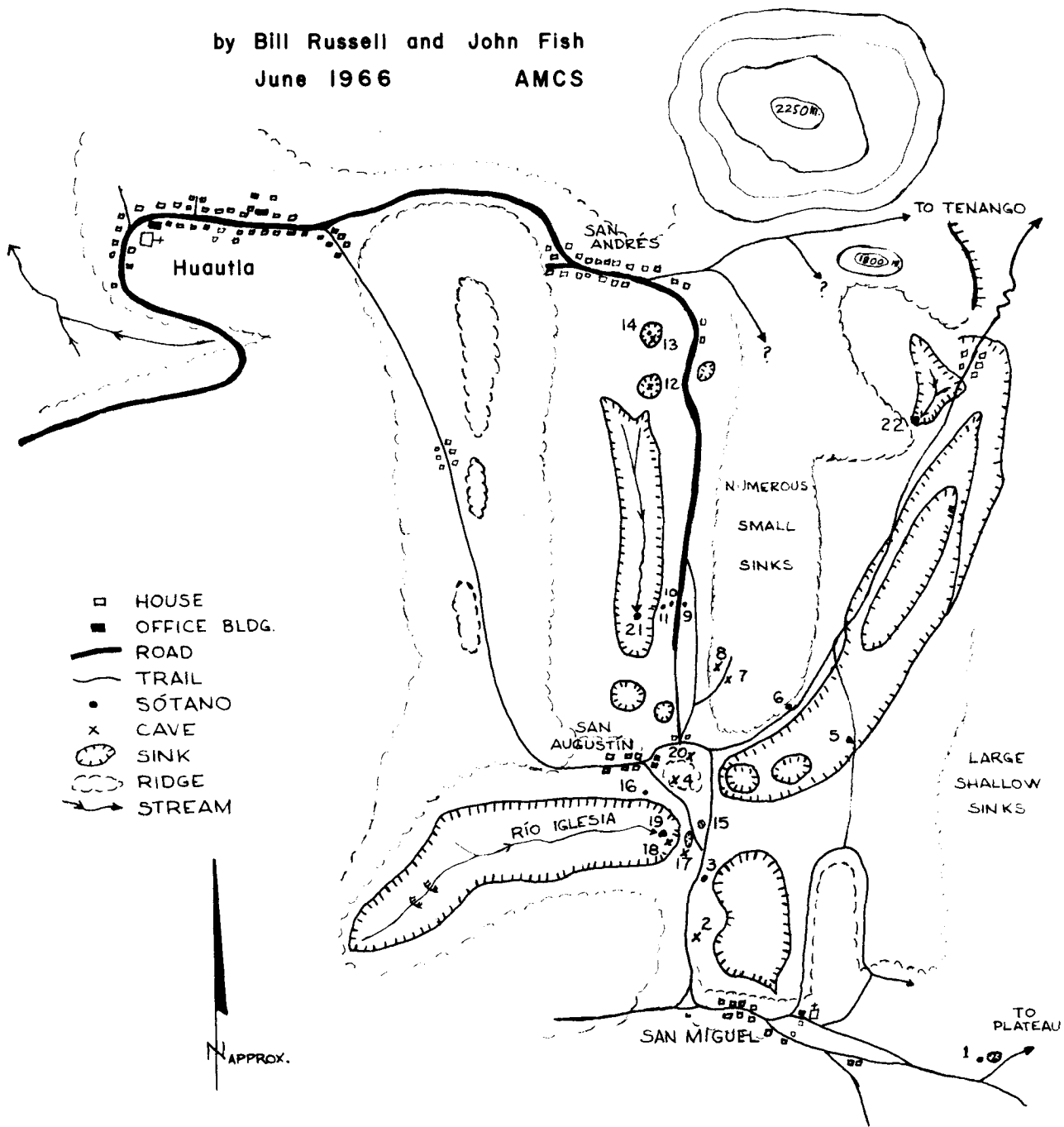
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HUAUTLA DE JIMENEZ, OAXACA
 AREA SKETCH MAP

by Bill Russell and John Fish
 June 1966 AMCS



HUAUTLA AREA: Small Caves (numbers refer to Area Sketch Map)

1. Pit near small sink along trail to plateau. Five seconds free-fall plus five more bouncing. Unexplored.
2. Cave along the west side of the San Miguel dolina, just below the trail near the pass to the Río Iglesia dolina. The cave was explored only to the end of the twilight zone and consists of a steeply sloping passage, that appears to turn to the left about 80 feet inside the cave.
3. Cave along the trail on the west side of the San Miguel dolina. The cave is directly in the pass to the Río Iglesia dolina. It is a sink with a steep slope going down about 40 feet to an unentered pit.
4. Cave in side of hill about 1/2 kilometer southeast of San Agustín on the short cut trail to San Miguel. This cave is just across ridge from Cueva de San Agustín and might connect with it. A steep slope leads downward from the entrance for about 70 feet to a 40 foot drop. The cave continues past the drop as a high fissure.
5. Pit under the trail between San Miguel and Río Santiago, and east of the pass near the end of the road. The entrance is small and covered with rocks, but the pit enlarges to about 50 feet in diameter. Rocks bounce for six seconds. Unexplored.
6. Pit about 60 feet deep located on the northwest side of the trail to Río Santiago. Two horizontal entrances about three feet high and four feet wide lead from the trail to the pit.
7. WATER TROUGH CAVE - This cave is located near a trail leading to the ridge above the road near the southeast end of the San Agustín dolina. The entrance lies at the bottom of a shallow sink, and is formed along bedding planes. Inside the entrance is a hollowed-out log for collecting water from dripping formations. The cave contains much fill material which has created a couple of short drops before completely filling the passage. Note the straight ceiling. See sketch map, page 66.
8. Small cave in sink just northwest of Water Trough Cave. Cave is about 20 feet long, and 10 feet high and wide. It slopes steeply downward to a dirt choke.
9. Small cave in road cut above entrance to Sótano de San Agustín. A short breakdown slope leads to a small room at the bottom.
10. Sink just across the road from cave 9. A dirt pit drops about 20 feet, and can be climbed. At the bottom is a small horizontal hole filled with water.

11. Pit just down hill from pit 10. From a small entrance the cave drops 30 feet to water. Unexplored.
12. Cave in bottom of a large sink just off road at the upper end of the valley which drains into Sótano de San Agustín. The cave is small, sloping steeply to a dirt plug.
13. Pit in large dolina above the San Agustín dolina and just below San Andrés. A small climbable entrance leads to a few hundred feet of small passage containing a very small stream. Crawlway continues.
14. Pit in same dolina as number 13. The entrance is about 10 feet by 20 feet and drops 15 feet to a short crawlway.
15. Pit by small sink at east end of valley, above the Sótano del Río Iglesia, near the convergence of the trails to San Miguel. The entrance is roughly oval shaped, 20 feet by 30 feet, and drops 120 feet to a dead end.
16. Pit high above the Sótano del Río Iglesia towards San Agustín, but below the trail from San Agustín to San Miguel. The entrance is known to be small, 10 to 15 feet in diameter, but depth is unknown. Unchecked.

HUAUTLA AREA: Large Caves

17. MILLIPEDE CAVE — This cave is high above the Sótano del Río Iglesia, just below the divide between the Río Iglesia and San Miguel dolinas, and to the right of the trail from San Agustín to San Miguel. It is formed in the collapse of a large solution pocket in the mountainside. The entrance is about 40 feet in diameter, quickly narrowing to 20 feet and sloping steeply (climbable) downward to a silt-floored room 75 feet below. A small duck-under through some formations leads to a shelf above the main floor of a room about 40 feet wide, 70 feet long, and 40 feet high. The floor was covered with dry, cracked mud, and had a little gully where water disappeared into the floor. At the far end of the room a large pile of breakdown rose steeply to the ceiling, with no evident passage-way through. On the shelf were found almost all of the cave fauna collected on the trip. The fauna consisted mostly of crickets, millipedes, spiders, and phalangids. **See sketch map on page 66.**
18. and 19. SOTANO DEL RIO IGLESIA and CUEVA DEL RIO IGLESIA — This system is located at the lowest point in the Río Iglesia dolina, which is southwest of San Agustín, and perhaps one mile long. The Río Iglesia runs the length of it, tumbling off the volcanic mountains at one end and disappearing into the limestone sótano at the other end. The entrance pit at the waterfall is approximately 120 to 150 feet deep, but the large volume of water makes entering at this point impossible. In June the stream was

about four feet wide and five inches deep, but this was before the rainy season really began.

Slightly above, and 100 yards to the right of the waterfall, is a large horizontal entrance to be same system. From here it is possible to approach the pit entrance by at least two routes. Immediately within the entrance, still in full daylight, a short passage leads to the left to a jungle covered ledge across from and overlooking the waterfall. From this vantage point one gets a proper perspective of the large, slot-like canyon, about 150 feet high and up to 25 feet wide, that the river disappears in to. The pit was rigged from this ledge.

Continuing into the cave along another route from the horizontal entrance, a downward slope and a duck-under leads to a large room. No major passages leave the room, but a tiny stream issues from a narrow fissure, runs across the room, and continues down a series of several small, interconnecting fissures. It is possible to climb down these to a lower passage which runs for a short distance to where it joins with the entrance pit, approximately 75 feet below.

From the tieoff point the drop is approximately 120 feet to a breakdown slope leading down to the base of the waterfall, which is a pool 30 to 40 feet in diameter. It was impossible to determine where the water continued from here as visibility was limited by heavy mist. As one faces the waterfall, there is a large passage (overflow or former water route?) to the right about 30 feet in diameter, which was followed for several hundred feet. After climbing down several drops a large pool is reached which must be traversed on the right. A short distance further a drop estimated to be 70 feet marks the end of present exploration. Water was heard at the bottom of the drop.

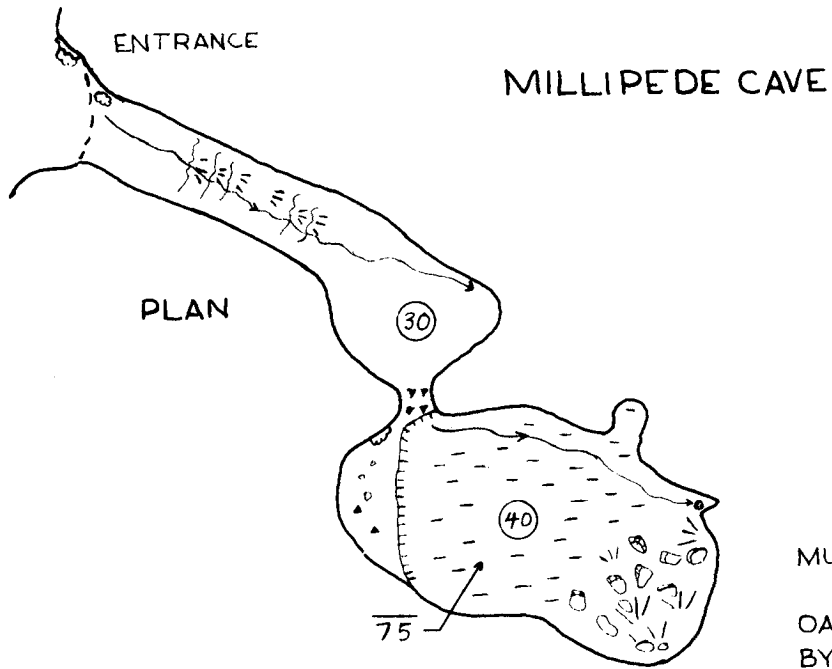
20. CUEVA DE SAN AGUSTIN - This cave is located in the side of the hill just to the east of San Agustín, and is visible from the trail at the end of the San Agustín valley. The entrance is about 50 feet wide and 40 feet high, but quickly narrows to a high fissure that leads from the right side of the entrance. The floor of this fissure slopes steeply downward to a drop of about 40 feet, formed where breakdown had wedged in the fissure. Below this drop the fissure widens from about 20 feet to over 35 feet, and turns slightly to the left. The floor in this area is of small breakdown and slopes gently towards a second, flowstone-covered drop. This drop is about 50 feet and leads into a continuation of the fissure. The fissure in this section is about 70 to 80 feet high and about 30 feet wide with a flat floor of compact dirt. Below the drop, drips and seeps have accumulated to form a small stream that flows along the right side of the passage to a third drop of about 10 feet. Beyond this drop the cave continues for another 200 feet before dropping again, this time into a deep pool of water. The passage does not end, but the water prevented exploration.

21. SOTANO DE SAN AGUSTIN - This sótano lies at the lower end of the long dolina stretching from San Andrés to San Agustín. The dolina is made up of a large central sink and several smaller sinks at each end just below the towns. The San Agustín dolina is roughly one mile long, one-fourth mile wide, and 500 feet deep. Streams running off of the volcanic ridges throughout the dolina drain into the sótano over a 250 foot waterfall.

The entrance is estimated to be 120 feet across, 70 feet wide, and 250 feet deep. It is best to enter on the side opposite the waterfall (a free drop through water), even though it is necessary to clear out a path through vegetation in order to rappel. From the bottom a high fissure passage goes back under the waterfall. A stream flows down a steep canyon requiring a handline and enters a very large room, so large that the first explorers momentarily got lost on the way out of the cave. Another stream emerges from breakdown to join the main stream. This room turns left over breakdown and short climbable drops to where several small rooms led to the next series of drops. The first three or four of these drops are about 30 to 40 feet each and are separated only by plunge pools. Here exploration ended due to lack of equipment, but waterfalls could be heard below.

22. CUEVA DE AGUA CARLATA - This large cave is located about three kilometers east of San Agustín on the northwest side of the main northeast trending valley. The cave is best reached by following the trail from San Agustín to Río Santiago until the east facing entrance is visible. The entrance is at the base of a ridge that is about one-half kilometer west of a small village called La Providencia. Between the town and the cave is a small valley containing numerous springs which form a sizable stream and flow into the lower cave entrance (see cave map on page 67).

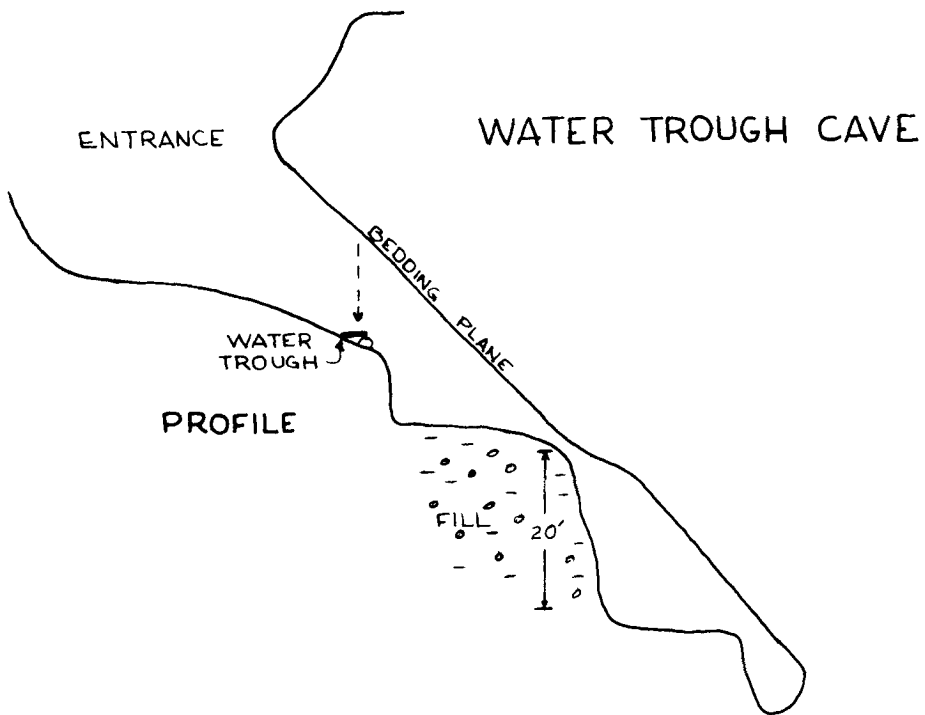
The lower cave entrance forms a large shelter about 150 feet wide, 50 feet deep, and 50 feet high. To the right as one enters the cave and up a short breakdown slope are two walking-size passages that lead for about 150 feet. One ends in dirt fill and breakdown, while the other narrows to a dirt filled crack. From the back of the lower entrance two passages connect with an upper entrance. Below this upper entrance a large passage about 50 feet wide and 40 feet high slopes steeply downward past the level of the lower entrance. The stream entering the lower entrance flows through one of the connecting passages and down a series of rapids and cascades. About 300 feet from the upper entrance there is a slight jog to the left and the passage becomes smaller, steeply sloping, and elliptical; approximately 30 feet high and 20 feet wide. The stream flows over two short drops to the top of a 10 foot waterfall, with another waterfall visible just beyond. The cave is unexplored beyond this point.



MILLIPEDE CAVE

PLAN

MUNICIPALITY HUAUTLA
 DE JIMÉNEZ
 OAXACA, MÉXICO
 BY BILL RUSSELL & JOHN FISH
 JUNE, 1966
 AMCS



WATER TROUGH CAVE

ENTRANCE

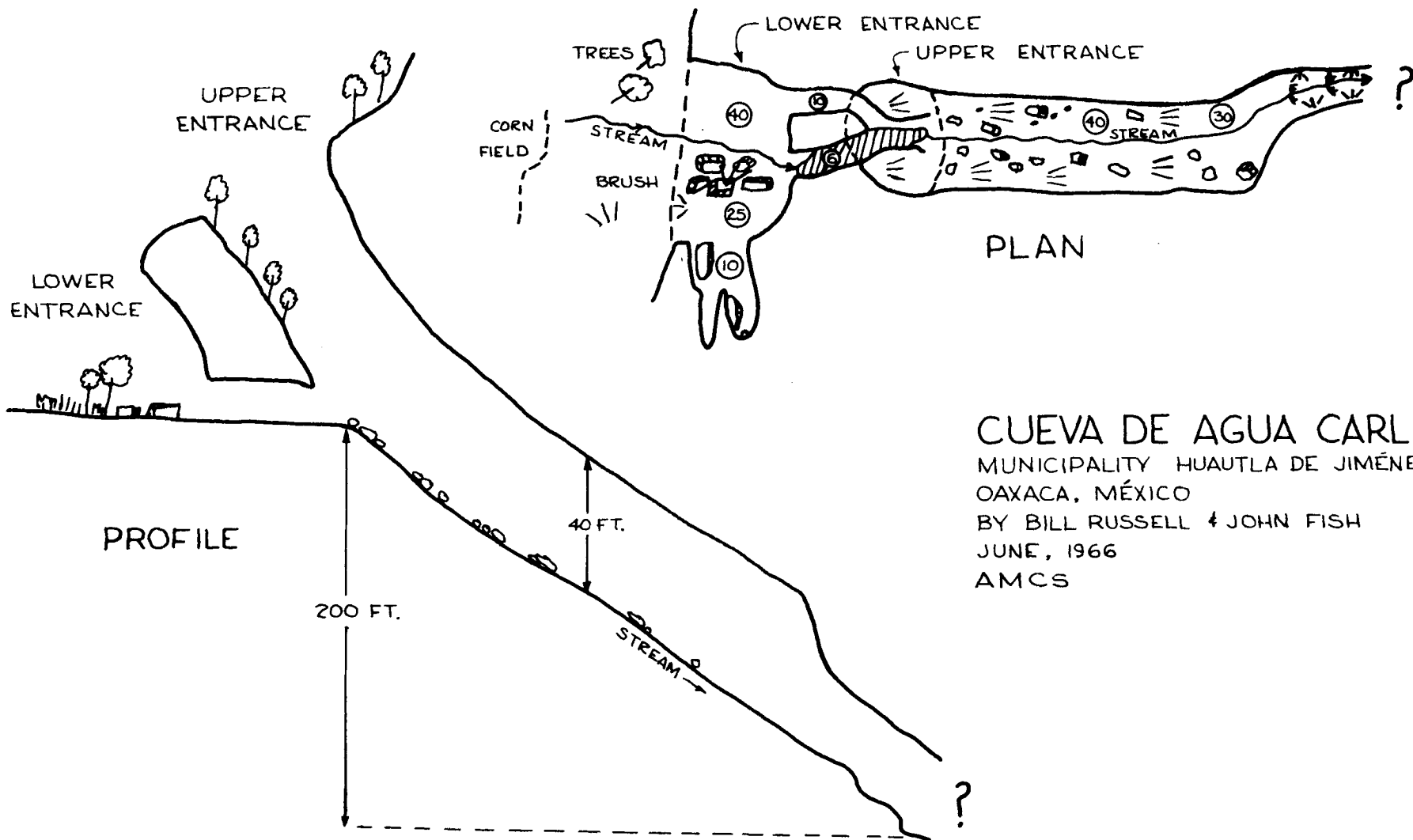
PROFILE

WATER TROUGH

BEDDING PLANE

FILL

20'



CUEVA DE AGUA CARLATA
 MUNICIPALITY HUAUTLA DE JIMÉNEZ
 OAXACA, MÉXICO
 BY BILL RUSSELL + JOHN FISH
 JUNE, 1966
 AMCS

ARCHEOLOGICAL OBSERVATIONS IN CUEVA DE SAN AGUSTIN

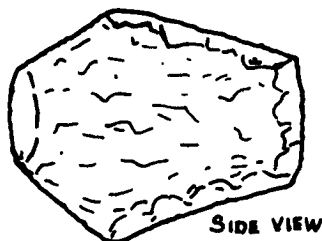
by Bill Russell

The trips to the Huautla area have been more of a reconnaissance than an intensive exploration, and as a result few archeological finds have been made. Of the caves investigated only one, Cueva de San Agustín, is of archeological interest. This cave is visible from the new road southeast of Huautla, and is located just east of the small town of San Agustín on the ridge that separates the San Agustín dolina from the Río Iglesia dolina. The entrance to the cave is a large shelter, with a fissure leading steeply downward from the right side of the entrance. After a short distance a 40 foot drop is encountered, the top of which can be reached without the aid of artificial light. Parts of several skulls were found scattered among small breakdown at the bottom of this drop. The skulls were not numerous, with parts of perhaps eight or nine found. A small jade hatchet (?) blade was discovered among rocks at the top of the 40 foot drop. This blade just fits what appears to be an artificial hole in the top of one of the skulls. This blade is made from jade containing numerous parallel imperfections and is about one and one-half inches long and one inch wide. (See diagram.) The breakdown slope at the base of the first drop leads to another drop, and at the base of this second drop are several large (3 inches in diameter) vertebrae imbedded in cave fill. These bones are of animals larger than any now living in the area and warrant further investigation.

It is quite possible that this cave is the same as the one noted on a crude 1763 map of Huautla. This pictorial map entitled 'Mapa de Huautla' was photographed by Frederick Starr in 1900. The map shows a cave entrance in a hill that looks much like the hill above Cueva de San Agustín, and on the map the cave entrance is surrounded by skulls. The map is not precise enough to determine with certainty if the cave is the one shown on the map. The cave located on the map is called Cueva de Oxtiupam, and on the next trip to the Huautla area cavers should inquire about that name, as well as more thoroughly investigate the cave.

One of the few archeological reports on the area, Howard F. Cline's "Colonial Mazatec Lienzos and Communities", published in the excellent book, Ancient Oaxaca, interprets the cave shown on the Mapa de Huautla as a picture of a cave showing remains of the 'kings'. Caves of this kind are described by the local compilers of data for the Cuadros sinópticos (1883) as cemeteries of "'kings and nobles of the Mazatec nation', from which the compilers extracted skeletal materials and pottery from a central crypt". (Ancient Oaxaca, pages 285-286.) If this interpretation is correct, there should be other skull caves, and AMCS members will be in a unique position to add to the archeological knowledge of the area.

DRAWN TO SCALE



EDGE VIEW

RECENT PAPERS ON MEXICAN CAVE BIOLOGY

by James Reddell

This will be the first of several annotated lists of papers dealing with the cave biology of Mexico. Most of the following papers have been a result of collections made by members of the Association for Mexican Cave Studies.

1. Barr, Thomas C., Jr. 1965. "A new cavernicolous sphodrine from Veracruz, Mexico (Coleoptera: Carabidae)." *Coleopterists' Bull.*, 19:65-72.
Mexisphodrus veraecrucis, new genus and new species, is described from Sótano del Profesor, Tequila, Veracruz, based on specimens collected by Terry Raines and Bill Bell. This is the first true carabid beetle of the tribe Sphodrini known in the Western Hemisphere and is probably a troglobite.
2. Bowman, Thomas E. 1964. "Antrolana lira, a new genus and species of troglobitic cirolanid isopod from Madison Cave, Virginia." *International J. Speleology*, 1(1-2):229-236, pl. 50-57.
 In addition to describing Antrolana lira, new genus and species, from Virginia and redescrbing Cirolanides texensis from Texas caves, this paper includes a key to the genera of cirolanid isopods of the Western Hemisphere. The Mexican Speocirolana is elevated from sub-generic to generic rank. This genus has two troglobitic species, S. pelaezi and S. bolivari, both known only from Mexican caves.
3. Bowman, Thomas E. 1965. "Xilitloniscus, a new genus for the Mexican troglobitic isopod, Cordioniscus laevis Rioja (Oniscoidea: Trichoniscidae)." *Proc. Biol. Soc. Washington*, 78:209-216.
 A new genus, Xilitloniscus, is erected for the troglobitic terrestrial isopod, Cordioniscus laevis Rioja. Originally described in 1956 from Cueva de la Hoya, near Xilitla, in San Luis Potosí, on one female, collections of both males and females in Cueva de la Porra by Bill Russell and in Cueva de la Selva by Terry Raines and Bill Bell have allowed the species to be redescrbed and placed in the correct genus.
4. Causey, Nell B. 1963. "Mexiterpes sabinus, new genus and new species, a Mexican Troglobite (Diplopoda: Trichopetalidae)." *Psyche*, 70(4):235-239.
 A new genus and species of milliped, Mexiterpes sabinus, is described from Sótano del Arroyo, near Ciudad Valles, San Luis Potosí. It was collected in November 1962 by James Reddell. This is the first Mexican record for the family Trichopetalidae. Only one specimen, a female, has been described.

5. Causey, Nell B. 1964. "New cavernicolous millipeds of the family Cambalidae (Cambalidae: Spirostreptida) from Texas (U.S.A.) and Mexico." *International J. Speleology*, 1(1-2): 237-246, pl. 58-59.
In addition to the description of one species with two subspecies from Texas and the redescription of one Texas species, a new genus and species of cambalid milliped, Mexicambala russelli, is described. This species represents the first Mexican record for the family Cambalidae and was collected in Cueva de la Porra, near Xilitla, San Luis Potosí, by Bill Russell.
6. Causey, Nell B. 1964. "Two new troglobitic millipeds of the genus Glomeroides from Mexico (Glomerida: Glomeridae)." *Proc. Louisiana Acad. Sci.*, 27:63-66.
Glomeroides caecus, new species, is described from Sótano de Huitzmolotitla, San Luis Potosí, on material collected by Terry Raines and Tommy Phillips. Glomeroides promiscus, new species, is described from Sótano de Gomez Farias, Cueva de Rancho del Cielo No. 3, and Cueva de Rancho del Cielo No. 7, on material collected by James Reddell, David McKenzie, and Larry Manire. The order Glomerida had previously been reported only once from Mexico. Both species are troglobitic.
7. Hendrichs, J., and C. Bolivar y Pieltain. 1966. "Hallazgo de un nuevo Mexisphodrus cavernicola en el estado de Hidalgo (Mexico): M. gertschi nov. sp. (Ins. Col., Carab.)." *Ciencia*, 25(1):7-10, lam. I.
Mexisphodrus gertschi, new species, is described from a small cave in a road cut near Jacala (named by us, Cueva de El Ocote). This is the second species of the genus Mexisphodrus to be described from Mexico. This species was collected by Drs. W. J. Gertsch and Wilton Ivie of the American Museum of Natural History. It is apparently a troglophile.
8. Schultz, George A. 1964. "Mexiconiscus tlamayaensis, a new genus and species of terrestrial cave isopod from San Luis Potosí, Mexico." *Trans. Amer. Microscop. Soc.*, 83(4): 376-380.
Mexiconiscus tlamayaensis, a new genus and species of troglobitic terrestrial isopod, is described from Sótano de Huitzmolotitla, near Tlamaya, San Luis Potosí. Only one male specimen is known; it was found in November 1962 by T. R. Evans.
9. Schultz, George A. 1965. "Terrestrial isopods from caves and mines in Texas and northern Mexico with a description of Venezillo tanneri (Mulaik and Mulaik) allotype." *Texas J. Sci.*, 17(1):101-109.
Terrestrial isopods are reported from twenty Texas and two Mexico caves. The Mexican records are of special interest. Porcellio gertschi, reported here from Cueva de los Lagos, near Ciudad Acuña, Coahuila, had previously been known only from a surface collection near Ciudad Valles, San Luis Potosí. Venezillo tanneri, reported

here from Gruta del Palmito, Nuevo León, had previously been known only from a single female specimen described from Edinburgh, Texas. This species is represented by both males and females in Gruta del Palmito and is here redescribed. Both of these species are probably troglomenes. In addition, the troglitic cirrolanid isopod, Speocirolana pelaezi, is reported from Sótano del Arroyo, San Luis Potosí.

10. Vandel, A. 1965. "Les Trichoniscidae cavernicoles (Isopoda Terrestria: Crustacea) de l'Amerique du Nord." *Annales de Speleologie*, 20(3):347-389.

In addition to new species described from Texas and eastern caves, new records are included for the Mexican terrestrial isopods. Protrichoniscus bridgesi is reported for the first time from Sótano del Arroyo, Sótano de la Tinaja, and Ventana Jabalí, San Luis Potosí. Protrichoniscus villalobosi is partially redescribed and is recorded for the first time from Cueva del Carbón, San Martín, Veracruz.

The AMCS NEWSLETTER is published six times a year by the Association for Mexican Cave Studies, P.O. Box 7672 University Station, Austin, Texas 78712. Membership in the AMCS is \$5.00 for the calendar year, with memberships starting at the first of each year. Persons joining after the first of the year will receive all publications for that year. Also, publications for the year of 1965 are still available by writing to the AMCS.

Members are urged to submit articles for publication. The article may cover any phase of Mexican speleology. Trip reports are requested from all trips.

Editor..... Terry W. Raines
 Assistant editor..... John Fish
 Treasurer..... Philip Winsborough

THE ASSOCIATION FOR
MEXICAN CAVE STUDIES

NEWSLETTER

TRIP REPORTS

Xilitla, S.L.P.

Xilitla, S.L.P.; Guerrero

Cueva del Diablo, Sabinas Hidalgo, N.L.

HISTOPLASMOSIS

PARQUE NACIONAL DE LA GRUTA DEL PALMITO

THE ORDER RICINULEI IN MEXICAN CAVES

MEXICAN CAVE BIOLOGY: ANNOTATED BIBLIOGRAPHY

THE ASSOCIATION FOR MEXICAN CAVE STUDIES
NEWSLETTER

Volume II Number 4

July - August

Publication date: March, 1967

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NEWS NOTES

→ Dennis Barrett and John Fish are beginning a rock-throwing program. Many data points are needed to plot a graph of depth of pit versus time. The accumulated data and a theoretical curve will be published in the NEWSLETTER when enough information is available. We need your help in this project.

Specifically, we want the total time of fall for a rock plus the time for the sound to return to the top. Data may be taken either in a vertical shaft or on a cliff face or tower (choose a calm day). Select pits that are at least ten feet in diameter and that do not "trap" the sound because of a large room below. Use moderately rounded limestone rocks approximately three inches in diameter, and time their free fall with a stopwatch. Take ten good measurements (discard misreadings) and send all data to the AMCS in Austin. Briefly describe the pit with a few words and/or profile sketch, or indicate data collected on the surface. Be sure to include an accurately determined depth, to the nearest foot if possible. Contributors will be acknowledged in the final report.

→ Now available from the AMCS at no cost is a "Mil-to-degree Conversion Table". On a 5" by 8" card is printed readings from 0 to 6400 mils, at increments of 20 mils, with their corresponding equivalents in degrees (0° to 360°). To those owning and using army surplus Brunton compasses (which are calibrated in mils) this card should prove very useful. With your order please include a 4 cent stamp to cover postage.

TRIP REPORTS

Persons: Lew Bicking, Mark Blumenstein, Bob "Rooney" Burnett,
Kenny Laidlaw, Squire C. L. Lewis, Joe Pendleton, Terry
Raines, Rick Rigg, Stanley Spencer, Bob Thren, Sam and
Diane Young

Date: 1-9 July 1966

Distination: Sótano de Tlamaya and the Xilitla area

Reported by: Terry Raines Austin, Texas

During the 1966 National Speleological Society Convention at Sequoia National Park, California several groups of cavers finalized plans for a trip to Mexico. They arranged to meet at Terry Raines' house in Austin, Texas and from there drive to the Xilitla area and Sótano de Tlamaya. Everyone arrived on Friday, July 1st as planned and out of this large number of people four groups were condensed: Kenny, Rick, and Lew in Kenny's 4-wheel drive pickup; Mark and Stan in Mark's car; Bob, Squire, and Joe in Bob's car; and Terry, Rooney, Sam, and Diane in Terry's pickup. Late that night the party left Austin.

2 July About 3:30 AM Saturday morning we crossed the Río Grande and encountered the greatest mass of confusion at Mexican Customs that any of us had seen in a long while. It seemed as if every gringo tourist in the United States was trying to cross the border at once and get to Monterrey. (This was the 4th of July weekend.) Five hours later all of our groups had their papers and we left town heading south. Nightfall found us just outside Ciudad Mante driving along a dirt road toward El Nacimiento del Río Mante, an excellent camping spot. But we quickly discovered that the dirt road was impassable due to the heavy rains a week previous. In fact, all the way from Monterrey we had been noticing that every arroyo and river, which was usually dry, contained raging torrents of water. In lieu of camping at the Nacimiento, we slept by the road below the large cliff-entrance of Cueva de El Abra, located only a few miles south of Mante. (For a description and map of Cueva de El Abra see AMCS NEWSLETTER, Volume I, Number 2, page 17.)

3 July The journey was continued on south through Ciudad Valles to the turnoff of the new road to Xilitla. This road follows Arroyo Seco and passes through some extremely promising mountains which remain completely unexplored as far as caves are concerned. We were passing a point approximately halfway between the turnoff and Xilitla when a most unfortunate incident occurred. Rooney, who had been sleeping in the back of the truck, decided to ride on the rear bumper in order to get a better view of the spectacular canyon and surrounding mountains. As he was climbing over the tailgate and onto the bumper, as he had done a hundred times before, his foot slipped and he fell. For a moment he was able to hang on and was dragged by the truck, but soon had to let go and went tumbling to a stop in the middle of the gravel road. Injuries sustained were a severely torn knee, and several other much less serious cuts and scrapes. He was rushed to Xilitla where a doctor did the best job he could with the facilities he had available. With Rooney now patched up, the group continued on to Rancho de Huitzmolotitla near Tlamaya, where we camped with the permission of Sr. Ismael Larios, the ranch foreman.



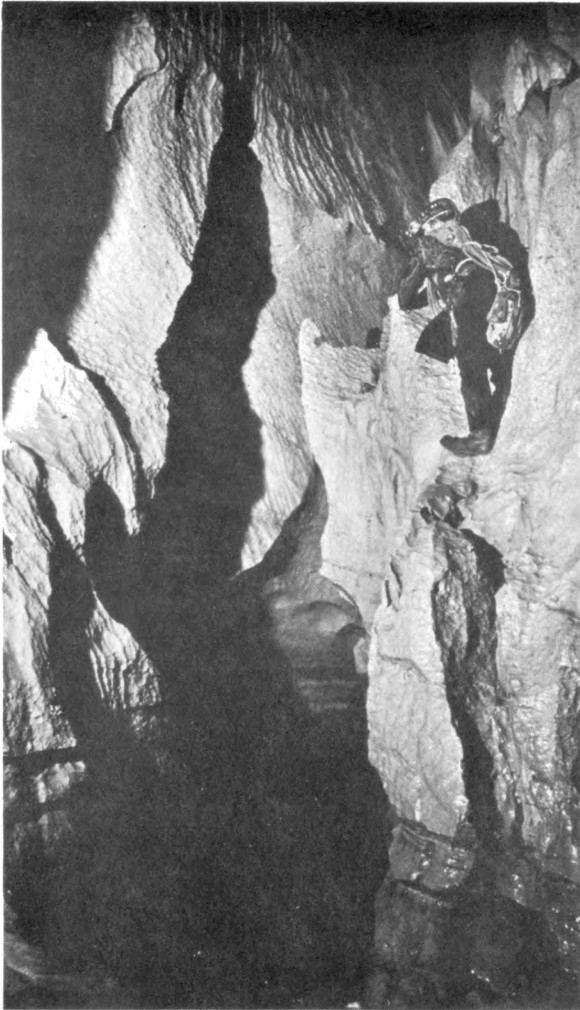
View north along valley of the Inter-American Highway. The Xilitla-area caves are located in the mountains to the left (west).



The Tlamaya solution valley, about one kilometer across, with the prominent peak of La Silleta in the background; view looking west.

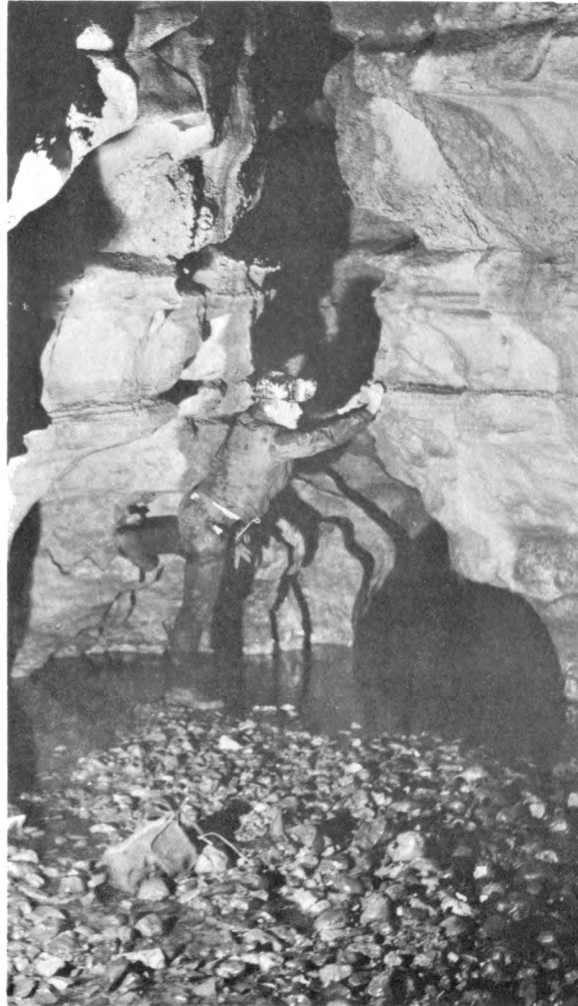
4 & 5 July The night was passed with great pain and discomfort for Rooney and the next morning it became apparent that he would have to return to Austin immediately. With Bob's car being the fastest vehicle available, the Good Squire volunteered to drive and so the two departed early that morning. The remaining group continued on as planned. Equipment was organized and we headed down to Sótano de Tlamaya. Seven would go into the cave: Joe, Rick, Bob, and I to the end, Sam and Diane to the top of Junction Pit, and Mark to the bottom of the entrance drop. The main purpose of the trip was to take pictures and collect insects throughout the cave. Upon arriving at the cave about 9:30, we noticed that the arroyo leading into the entrance was washed clean and from the local people we learned that it had been raining almost steadily for the past week. This was the reason for the high level of the rivers we had noticed on the trip down. We began the descent of the entrance pit and everything continued smoothly from then on. The water level was surprisingly low, considering the recent rains, which indicates that the system drains very quickly. Bob, Joe, Rick, and I left Sam and Diane at the Junction Pit and continued on into the cave. Picture taking was slow work, but finally the Big Room was reached and we took a short rest. From the far end of the room we made a side trip into the Upstream Passage. (There are two stream systems in the cave. The first begins in the Entrance Room and siphons just before the Big Room while the other begins in the Upstream Passage, runs tangent to the far end of the Big Room, then continues on to the end of the cave.) The Upstream Passage is unusual in that it is of an oval cross-section, (not a fissure type as in the rest of the cave; see photographs on page 76) which averages 20 feet high and 40 feet wide. (See photograph of Upstream Passage on page 77.) This passage is well decorated with formations and continues 481 feet from the Big Room to a point where the formations almost block the passage. By continuing through a short water-filled crawlway, one can explore several hundred additional feet of passage before it is blocked completely by breakdown. While in the process of making photographs we were pleased to notice that the almost transparent worms, as yet undescribed, have not been killed off by the many people visiting the cave since their discovery. From here we back-tracked to the Big Room then continued on downstream. In this downstream section of the cave much chimneying is required to avoid the deep pools of water. The passage averages no more than 10 feet wide and usually the ceiling is well out of sight. After descending a 40 foot drop a short rest stop was made, then we continued on. Although the distance from the Big Room to the Pinnacle Drop is only 2717 feet, the constant climbing and chimneying became very monotonous. Also, fatigue was beginning to show on all of us and when we reached the 32 foot drop immediately preceding the Pinnacle Drop, all unanimously voted to rest. Ten minutes later Rick and Joe decided it best if they not continue on. So Bob and I pushed ahead in hopes of finding the cave beetle, *Sphodrini*, which had been reported to live near the end of the cave. Descending the 32 foot drop, we followed the passage a short distance further to the top of the Pinnacle Drop. Peering over, we expected to see only blackness and mist from the waterfall, but instead we were extremely surprised to find that the drop was filled with water! We knew that it had been raining heavily in the area for the past week but didn't expect to come upon anything like this. Evidently the rains had been so great that the local water table had risen. In the

Typical fissure passages in Sótano de Tlamaya. Photos by Terry Raines

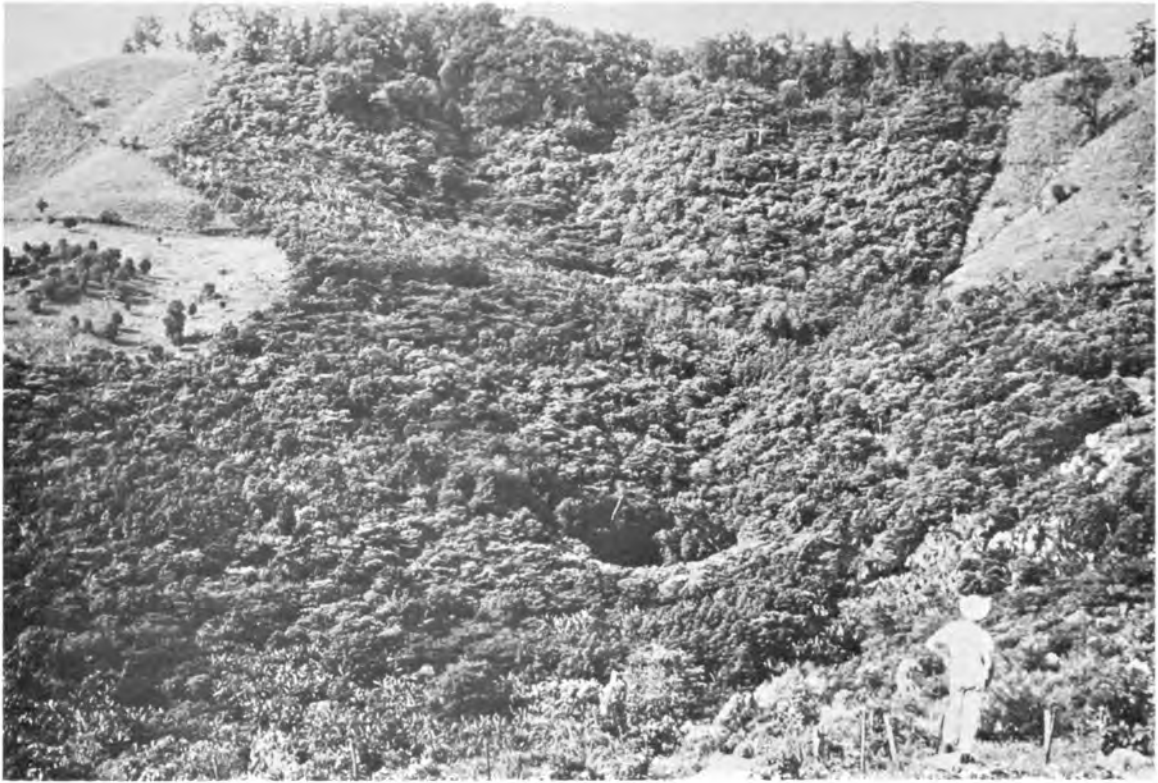


Bottom of Junction Pit.

Between Fossil Pit and Big Room.



Downstream from the Big Room.



Entrance to Sótano de Huitzmolotitla, 150 feet to 200 feet in diameter and 364 feet deep. Photo by Terry Raines



Upstream Passage in Sótano de Tlamaya near its junction with the Big Room. Photo by Terry Raines

valley below the resurgences were discharging very large amounts of water, another indication of the unusually heavy rains. We rappelled on down the drop as far as possible to find that the water level was within 30 feet of the top. This means that approximately 105 vertical feet of cave passage were submerged. So ended our search for the Sphodrini and any other insects that may have been past the Pinnacle Drop. We retraced our steps to where Joe and Rick were waiting at the top of the 32 foot drop. The return to the Big Room was slow, as we were still taking pictures. (I was anyway, Joe had dropped himself and his camera into a ten foot deep, water-filled hole.) The rest we took at the Big Room was most welcome. Each of us tried to keep warm as best we could, as we were soaked to the skin. Joe went to the trouble of sitting over his carbide light while resting his head on his knees, but Bob, Rick, and I just lay on whatever was available (ropes, packs, and other equipment) in order to keep off the cold rocks and damp ground. By the time an hour had passed we realized that to rest any longer would accomplish nothing, as all had become victims of spasmodic shaking. Moving quick so as to loosen up cramped muscles, each reorganized his equipment and began chimneying on towards the next drop. From the Big Room, just under 1000 feet of prusiking is necessary to reach the entrance. (For a profile map of the cave from the entrance to the Big Room see AMCS NEWSLETTER, Volume II, Number 1, page 18.) As we wanted to leave the cave as quickly as possible we left the ropes rigged down to the 800 foot level, planning to retrieve them in a day or two. By noon the last man had prusiked the 279 foot entrance drop and we were all back on the surface. We had spent approximately 26 hours in the cave. That afternoon we relaxed while relating our discoveries to the rest of the group. During the day that Rick, Joe, Bob, and I had spent in the cave, Lew and Kenny had headed a Brunton and tape survey of the Tlamaya area. Surveying mainly along the roads, they located Sótano de Huitzmolotitla and most of the other pits in the area. The finished map should prove to be very useful.

Squire had arranged a rendezvous at the border checkpoint with Sue Emory, Philip Winsborough, and Dennis Barrett, who rushed Rooney the rest of the way to the Austin hospital. He made it back to the patio at ten o'clock this night after a wild 1100 mile trip.

6 July After a slow start, Bob and I descended into Sótano de Tlamaya once more to recover the ropes we had left the day before. We were accompanied to the top of the Junction Pit by Lew and Stan, this being the first time either of them had been in a deep vertical cave. We made good time throughout the whole operation (down to the 800 foot level and back), even though rains during the night had caused a rise in water level. By nightfall we had hauled the last of the heavy, water-soaked ropes out of the cave, and glad we were.

7 July Everyone loaded into one truck and we headed to Xilitla for a good meal at a restaurant. Afterwards we drove just outside of town to Cueva del Salitre where we planned to finish the map which had been begun on an earlier trip. (See AMCS NEWSLETTER, Volume II, Number 2, page 40, 43-45.) This project took the better part of the afternoon and we did check out and map all rooms and passages. From the cave we drove back through Xilitla then on to Rancho de Huitzmolotitla, a distance of about ten miles.

8 July Early in the morning we met with a man named Antonio as previously arranged. He had agreed to show us the caves on Rancho de Suchallo, located immediately to the south of Rancho de Huitzmolotitla. The resulting hike through the jungle and orange groves to the various caves proved to be rewarding. Of the seven or eight pits visited, most seemed to be close to 200 feet deep. We were postponing actual exploration until later so as not to take up too much of Antonio's time. About noon we returned to Tlamaya and thanked Antonio for his help. Then, that afternoon we went back to the ranch and managed to explore three of the pits before dark. The first, named Sótano de Suchallo, was 15 feet by 20 feet at the top and dropped completely sheer for 205 feet to a flat dirt floor; no leads. The drop was made very spectacular by the large, green, moss-covered flutings that extended the entire length of the pit. Next explored was a pit, located near the first, that had a small entrance and was only 116 feet deep. Nothing of interest. The last pit had an even smaller entrance, three feet in diameter, and the following 192 foot drop did not enlarge to any extent. Like Sótano de Suchallo, the other two pits had no leads at the bottom. So ended a typical day of Mexican pit checking.

9 July Sam, Diane, and I had to leave and return to Austin, but the rest of the group spent several more days in the Tlamaya area. They made additional surface surveys and explored the balance of the pits shown to us by Antonio. Descriptions of these are in the continuation of this report. Maps of the various pits and the Tlamaya area will appear in later AMCS publications.

Notes on photographs:

The two photographs on page 74 are of scenes in the Xilitla area. The upper picture views the valley through which the Inter-American Highway runs. It is taken from the old road to Xilitla (seen at left center) at a point near where the road leaves the main north-south valley and climbs toward Xilitla. The high mountains shown at the left rise 2000 to 3000 feet above Tlamaya (just off the left-hand side of the picture) which is at an elevation of 1800 feet above the main valley shown here. Also, located at the base of the mountains are several large resurgences such as the Nacimiento del Río Huichihuayan. The greater portion of these high mountains remain untouched in the search for caves, as access is limited to rugged foot trails.

The lower picture shows the Tlamaya solution valley. This flat-floored valley is surrounded on all sides except to the east by the same high mountains as seen in the previous photograph. To the east the valley narrows to a pass which slopes out into the valley containing the Inter-American Highway. The entrance to Sótano de Tlamaya is located just above the valley floor off the left-hand side of the picture.

The other two pages of photographs, pages 76 and 77, are devoted to two caves. The upper picture on page 76 shows the entrance to Sótano de Huitzmolotitla, which is perhaps the largest pit so far discovered in Mexico. Estimated to be 150 to 200 feet in diameter, the pit tapers in only slightly until its bottom is reached, 364 feet below. The surrounding jungle vegetation continues down into its mouth for over one-fourth of the depth, and from this

point on, green mosses cover the walls. Leading from one corner at the bottom, a second pit drops 156 feet to a horizontal fissure passage slightly less than two miles long. Note the Xilitla-Tlamaya road which skirts around the entrance halfway between the pit and the top of the ridge.

The lower picture on page 76 and the three pictures on page 77 were taken at various points throughout Sótano de Tlamaya. They emphasize the predominant fissure-type passage development in the cave.

Report continued:

Date: 9-12 July 1966

Reported by: Squire Lewis

9-11 July With Terry gone the 9th and Mark and Stan taking off the 10th, we all promptly played hookey for the next three days. During this period we took the time to develop public relations and friendships with the residents of Tlamaya and feel that we left them with a far deeper understanding and feeling of rapport for cavers. It is to be hoped that future groups visiting the area will work towards maintaining the respect and good will we have always been accorded by our Tlamayan friends.

12 July We resumed work on the new pits and surface surveys from Huitzmolotitla to Rancho de Suchallo. Descended and surveyed were four additional sótanos, 157 to 211 feet deep. Also surveyed were two new caves, one a small sewer cave, the other with reasonable passage, not too long, and although a nice enough cave, not of special interest by general area standards. Extra caution should be used in any attempt to visit this cave as Antonio and others emphatically warned us of a heavy concentration of Cuatro Narices (fer-de-lance snake) in the rather dense jungles surrounding it. We named the cave "Cueva de Cuatro Narices".

While these eight new sótanos and two new caves are not of particular significance, the methods of getting them checked, tied in with the surface survey, and out of the way might be of value to future groups faced with a concentration of pits to be checked. A fresh climber was sent down each pit, who quickly checked and sketched it. The tape was stretched and ready to measure the rope as it was retrieved, then the rope immediately moved to the next pit ahead of the group, rigged, and was ready for the new descender. In only one instance did a second man go down as a backup man when one of the pits appeared to go. The surface survey team of Kenny and Joe followed up behind, tying in the pits' locations to the road survey. While the surface survey was being completed, a four man team quickly surveyed the two caves. Thus in the equivalent of an eight hour day, eight sótanos with a total of about 1400 vertical feet, about two miles of surface survey, and roughly 1000 feet of horizontal cave were completed and tied in with the main survey point at Rancho de Huitzmolotitla.

After completing the work, we thanked Sr. Larios for his hospitality then headed into Xilitla for a special banquet. Afterwards we continued down the road, camping south of the town of Huichihuayan. In the confusion, Bob, Joe, and I got separated from Kenny, Lew, and Rick and it was not until two days later in Mexico City that we learned that Kenny's beautiful four-wheeler broke down coming out the Xilitla road, delaying them several days in Cd. Valles and forcing them to alter their plans to travel with us down through

the southern areas. We learned this by accidently running into Lew in front of the American Embassy. Lew joined up with us for several days in Mexico City, then just disappeared one afternoon, soloing off across the horizon.

13 to 28 July Thren, Pendleton, and Squire: The balance of our trip was spent meandering around the country south of Mexico City, poking around ruins and doing the tourist bit with a visit to Grutas de Cacahuamilpa and Dos Bocas near Cuernavaca, the only additional caving activity. We left Mexico the 28th of July, with our first stop in Texas being Big Bend National Park, then AMCS headquarters in Austin for a few days of fellowship, and finally we continued on to make the "Old Timers" Reunion at Franklin, West Virginia.

Medical Notes: Xilitla, Ciudad Valles, Ciudad Mante

There is a competent young doctor on the main square in Xilitla, however his facilities are extremely primitive by our standards and his supplies limited. We have not thoroughly checked the town but believe this to be the only available services. The nearest clinic (clinica in Spanish) is in Ciudad Valles, 65 miles from Xilitla with, of course the Xilitla and Tlamaya roads to contend with if time is a factor. The clinic is not new or large but is well equipped and there are competent doctors available in the town. To quickly reach the clinic: driving north on Mexico 85 (Inter-American Highway), turn left in Cd. Valles at the Goodyear "Oxo" station onto Calle Juárez, proceed five blocks to the Hotel Condesa, turn right at the hotel onto Calle Morelos and the clinic is on the left in the middle of the block, Number 59 Calle Morelos. An English speaking interpreter lives somewhere within the block and can be sent for on request.

In Ciudad Mante there is a large new modern clinic right on Mexico 85 as you enter the south end of town.

In the incident where it became necessary to rush Robert Burnett from Tlamaya to Austin, we called Austin from Ciudad Mante and arranged for a fast car and fresh competent help to come down from Austin and rendezvous with us at the twenty mile border check-point inside Mexico. This worked very smoothly and would be of special value in the event the original vehicle was a truck, particularly slow, or small and uncomfortable. In our case it solved passport and car paper problems, relieved the single driver, and permitted him to rejoin the trip at Tlamaya.

Persons: John Fish, David McKenzie, James and Janie Reddell,
Richard M. Smith

Date: 2-19 August 1966

Destination: Xilitla, S.L.P. and Guerrero

Reported by: John Fish and James Reddell Austin, Texas

2 August James, David, Richard, and John left Austin about 6 PM and spent the night with the sand burrs and mosquitos along the banks of the Río Sabinas just west of Sabinas Hidalgo, N.L.

3 August About 26 miles west of Monterrey on the Saltillo road, we stopped to locate one of F. Bonet's caves called Cueva de Casa Blanca. A crude sketch map is to be found on a wall of Restaurante Casa Blanca, and the map showed a large, horizontal cave. However, we found a different cave, Cueva del Aguila Oro (Gold Eagle), in a canyon just south of the villa. This cave is reached by climbing a few hundred feet up a talus slope to a small opening leading to a 3 to 5 foot wide fissure choked with dust. A series of short climb-able drops go down to about 100 feet where further climbing without equipment was difficult because the fissure became narrower. A few minutes more searching did not reveal the entrance of C. de Casa Blanca, so we drove on to Matehuala. We turned east on the paved road to Doctor Arroyo to check out some rumored gypsum sinks. After a brief survey of the gypsum plains, we settled down beside a large gypsum sink for the night.

4 August This morning we explored Sumidero de Matehuala, located about one mile east of Matehuala. One entrance sink 50 yards from the road is about 100 feet long, 40 feet wide, and 25 feet deep and has a 40 foot deep shaft, 10 by 15 feet, at one end leading to a series of rooms connected by small passages. Another sink 200 yards away connects with the same cave. A small stream is encountered which soon siphons. Crickets, spiders, and eyed Rhadine were collected. Two other large gypsum sinks were found further south of the highway, but neither was checked because equipment was needed. Further east is a flat grassy plain with many shallow dirt and gypsum sinks averaging 30 feet across and 8 to 10 feet deep, but none we saw contained caves. It appears that water settles in the sinks during the infrequent rains and slowly drains through narrow cracks in the gypsum.

Driving south of Matehuala, we stopped briefly by kilometer post 556 and looked at a few dozen gypsum sinks but found no caves. We then drove to San Luis Potosí and took the new road to Cd. Valles. Soon we crossed a pass at 2900 meters elevation (9500 feet) and descended to Valle de los Fantasmos (8500-9000 feet). This valley is covered with lapies, karst pinnacles, sinks and caves, and a red earth (volcanic) topsoil. Most of the sinks are filled and the sótanos are usually 30 to 50 feet deep, seldom over 100 feet. We checked several pits with depths of about 30, 35, 40, 60, 80, 90, and 140 feet. Cueva de Aguacate and Cueva de Carnicería were also checked. Apparently they are the largest known caves in the immediate vicinity. They both are single rooms, roughly 50 feet in diameter and 30 feet deep, formed by collapse. Cueva de Aguacate has a large natural bridge and both caves have small alcoves among formations, but no passages. A good campsite at the high end of the main valley was located and we sacked out for the night.

5 August In the town of San Francisco, within Valle de los Fantasmos, is an arroyo with a small stream, a little less than one fire hydrant, which enters Sótano de San Francisco. The entrance to the

pit is about 15 feet in diameter with water cascading over the side. John entered the sótano and found that about 100 feet down it narrows to a 15 foot in diameter smooth pipe. Here the waterfall is broken up into droplets which completely fill the air. Fifty to seventy-five feet below a fissure 40 feet long and 15 feet wide is encountered, where it is possible to swing out of the waterfall. I descended another 75 feet to the point where another sewer pipe about 7 feet in diameter continued straight down. Using a large electric light I could follow the walls down for perhaps another 100 feet until the reflection from the water drops obscured further penetration. Noting that only 20 feet of rope remained, I returned to the surface.

We left San Francisco that afternoon and continued eastward toward Ciudad Valles. A few miles down the road we reached another valley floor. Inquiry led us to Cueva de La Rusias. The entrance to the cave is 3 feet in diameter and drops 8 feet into a small 10 foot high, 10 foot wide room. Three passages lead from this room. One is a short crawlway; another a low squeezeway that was not checked; and the main passage which extends 150 feet averaging 5 feet wide and 12 feet high, ending in a flowstone mound reaching to the ceiling. The cave is in the wall and near the bottom of a wide valley, most of the drainage of which appears to be subterranean. Another small cave with a stream entering it was located nearby, but remained unchecked.

We drove on past Río Verde and up into the mountains, where just before dark we were led to two caves about one mile east of the turnoff to Cárdenas. Cueva del Agua is located at the base of a sloping bluff a few hundred feet below the road along one side of a wide shallow valley. The walk-in entrance slopes down to a silt-floored room about 15 feet in diameter and 8 feet high. Two alcoves with short crawlways soon end, but immediately inside the cave to the left a flat dirt-floored passage 5 feet high extends 50 feet before entering a room 20 feet in diameter. A slope leads down to a lake which is up to 6 feet deep and contains eyed crayfish (*Procambarus*). Across the lake a passage leads to a small dome room where the stream siphons. Another narrow passage with running water extends 50 feet from the lake but becomes impassable. About 100 feet away is another small cave, Nacimiento del Agua Chica, through which the stream exits.

6 August The miserable night spent by the roadside with cactus, mosquitos, and trucks should have been a portent of the impending fiasco this day would bring. Our first stop was a large closed valley more than a mile long containing "muchos sótanos". A boy led us from dirt sink to dirt sink until we almost gave up. Then we found a small arroyo emptying into a pit about 8 feet in diameter and estimated to be 50 feet deep. We decided it wasn't worthwhile to come back with equipment to explore it because rocks hit a mud floor. As we left this valley we jokingly dubbed it "Valle de los Sótanos". From here we drove on until we hit an area of inviting dolinas. After an hour of being led through jungle to holes too small to enter, we continued onward towards Cd. Valles.

Fifty-five kilometers west of Cd. Valles we were told of a river and waterfall and of a large locally popular cave near Agua Buena. Our luck was due for a change, so we decided to check out the lead. We were in limestone mountains that looked as if there had been some karst development. A refreshing swim in the river below the waterfall renewed our spirits for more caving. From Agua

Buena, a dozen eager guides led us up an easy trail then onto a well-used path up a steeper slope. Shortly we turned off the good path to a faint "path" through the jungle until finally we made our way directly through the undergrowth to the cave. After resting we climbed among the formations, breakdown, fissures, and entrances for awhile. Then James and I were led to another cave a few hundred feet away which was a great complexity of more entrances, breakdown, and formations. Much of the cave we explored is climbable, but one entrance has a 150 foot drop into a large room, 60 feet wide and 100 feet long. Probably most of the cave remains unexplored. It is a one hour hike up to the cave and it should be checked more thoroughly. We were also told of a much larger cave which involved a three hour hike. Because darkness was rapidly approaching we returned to Agua Buena and drove to the Hotel Condesa in Ciudad Valles to recuperate for the night.

7 August This morning we drove to Xilitla, taking the new road. Sharp folds in roadcuts reveal some of the tectonic forces that have acted in the area. A large entrance on the opposite side of Arroyo Seco and to the east of Xilitla was spotted but not checked. Instead, we drove to Ahuacatlán and found two sótanos on the uphill (north) side of town which were not entered but estimated to be about 150 feet deep. A cave near the church in Ahuacatlán was explored. Named Cueva de Iglesia, the cave is entered through a jungle-covered sink about 15 feet in diameter. A slope to one side leads down 15 feet into a 10 foot high and 5 foot wide passage which extends in one direction about 150 feet to a dirt bank rising to the ceiling. In the other direction there is trash on the floor, a second entrance is encountered, and a short passage leads to a flow-stone alcove which contained salamanders.

About one mile west of Ahuacatlán we stopped momentarily to see Sótano del Pozo and Sótano de las Hoyas before continuing on about 10 miles to Madroño. A few very small caves were visited just at dusk. In Cueva de las Tablas (so called because of lumber stacked in the entrance) James caught a new species of sphodrinid (beetle) and many salamanders were seen.

8 August Our planned destination was the mountains west of Jalpan, 55 miles west of Xilitla. A United States Geological Survey report on the Bernal-Jalpan area indicated some karst development. About 5 miles west of Jalpan we arrived at a high pass, Puerto Animás, beyond which lay the Río Jalpan and Puente de Dios. About one thousand feet below the road and one kilometer to the south of Puerto Animás, the Río Jalpan sinks and travels an underground course, emerging three kilometers away and 400 feet lower. We walked down a major trail then turned onto a switchback trail that drops to river level near the 400 foot thick "bridge" where the river plunges underground. The 3 foot deep, 20 foot wide river tumbles over a series of rapids before passing over a drop estimated to be 40 feet into a 100 foot high, 50 foot wide room filled with spray. We could not get close enough to the drop to see more than about 100 feet into the passage. After standing in awe for several minutes, we decided to look for caves on top of the Puente de Dios and perhaps visit the lower entrance to the river system. Exploration might be more feasible during the dry season.

Two caves above the river on the puente were found. Sótano de Puente de Dios del Río Jalpan has two small holes about 15 feet apart that drop vertically for 60 feet into a room 40 feet in diameter and 50 feet high. On the right side two holes drop an unclimbable 30 feet into a dirt-floored, dead-end room. On the left

side a steep talus slope of loose fist-sized rocks leads 15 feet to the lip of a 35 foot unclimbable drop. This drop intersects one end of a room 50 feet long, 20 feet wide, and extending up to a small hole at the surface 100 feet above. The cave is extremely attractive with walls covered with wet flowstone and many stalactites. The floor of the lower room contained a 5 foot in diameter dry pool several inches deep in which were found hundreds of cave pearls.

Located a few hundred feet away, the entrance to Cueva de Puente de Dios del Río Jalpan is a 3 foot in diameter hole dropping to a talus slope extending down about 40 feet. Here a passage to the right slopes up for about the same distance to a second entrance 2 feet in diameter. The main room is 40 feet in diameter and 4 to 6 feet high. A slope extends 100 feet horizontally to a 5 foot and 4 foot drop leading to a short dead-end passage.

This night was spent beside the road and from a nearby roadcut many camel crickets were collected.

9 August This morning we drove west of Puente de Dios towards Pinal de Amoles. In a roadcut on the left side we discovered Cueva Chevrón, a small cave in a concave down chevron fold. The cave is formed along the fold axis in thin-bedded limestone of the undifferentiated Soyatal-Mexcala formations. A 5 foot high and 4 foot wide triangular passage leads into a narrow fissure passage 100 feet long and averaging 12 feet high. The walls are covered with crystals and delicate crystalline helictites. The passage ends by abruptly becoming very small.

We continued the climb up to the pass at Pinal de Amoles (10,000 feet elevation), 20 miles west of Jalpan. From the pass the view westward was breathtaking. About one mile beyond the pass we inquired about caves and were shown two. Cueva de Tejamanil (named for a villa) has a 5 foot wide by 6 foot high entrance which slopes downward 15 feet to a 20 foot vertical drop into one side of a 10 foot wide by 40 foot long room. A small waterfall drops over flowstone-covered walls from a possible passage near the ceiling and opposite the cave entrance. Several inches of water collect on the floor and overflow to form a stream through gravel and breakdown. A 3 foot in diameter hole below the entrance slopes steeply for about 20 feet into a second room. No passages lead out. A log ladder is in the entrance and the other drops can be climbed.

Sótano de Tejamanil lies about one-half mile north of the highway at the end of a steep arroyo. The pit is approximately 25 feet in diameter and drops 100 feet to a gravel floor. A small passageway with water extends about 20 feet from the bottom and a small alcove with silt and debris on the floor can be reached by crawling over a formation. Of great interest were six specimens of blind beetles collected on a moist flowstone wall.

We were told that there were several other caves and pits in the vicinity. Six to ten miles northwest of Pinal de Amoles is a highland area reported to contain numerous sinks and internal drainage. Two large springs at the west base of the plateau carry most of the water. It is potentially a very promising area but hiking will be necessary.

Since we had to be in Mexico City on the 12th, we decided to return to Puerto Animas to check out a rumored large cave rather than spend several days hiking.

10 August We again descended to the Río Jalpan and walked two miles upstream from the Puente de Dios. Here we found Cueva de

los Riscos (see sketch map on page 87), only a few feet above the raging river. The main entrance ducks under a natural bridge to a large collapse skylight sink, then slopes steeply downward over boulders to the main cave floor about 60 feet below the river level. Straight ahead is a 300 foot long tunnel averaging 75 feet wide and 60 feet high. To the right of the entrance a large passage quickly ends in a breakdown mountain, through which we could find no way. The floor is made up mostly of silt, dried mud, and a little sand. Meander channels are present. Near the back of the main room a flowstone mound occupies the right-hand corner and has collapsed in one area. A few alcoves among formations are present, but no passages are known to lead out. On the left side the ceiling drops to about 7 feet then rises to about 20 feet. The passage continues about 150 feet more until flowstone-covered rocks terminate the passage. Near the entrance are two small passages leading further upriver. One fissure-like passage turns to a crawlway and comes out 2 feet above the river level. The other passage goes into a room, up a few drops, and finally comes out about 50 feet above the river. The river only has to rise two feet during storms to flood the cave. Not enough time was available to map the cave but it certainly would be worthwhile. After leaving the cave we drove to Madroño for the evening and located a few more caves after dark.

11 August In the morning we checked two small caves at Madroño. One dropped 10 feet into a small room with no passages. James and David explored Cueva de Camposantos which was a series of short drops in a fissure to the end, about 100 feet below. More sphodrini were collected.

After breaking camp we returned east to La Y Griega on the Inter-American Highway where David and Richard caught a bus for Austin, Texas. Of great importance to future work done throughout most of the Xilitla area is the highway under construction from La Y Griega to Highway 57 just southeast of Querétaro. Much of the highway is complete and construction is proceeding rapidly.

James and I turned south along the Inter-American Highway and continued driving up into the mountains. We stopped many times to ask about caves to find out how much cave development there was. Only a few small caves were visited. Apparently there are caves all along the mountain range, but pits do not seem to be predominant or well developed. Much more information is needed about the caves between Tamazunchale and Jacala.

12, 13 August James and I arrived in Mexico City, obtained a hotel room, and met Janie Reddell at the airport Friday night. Saturday we wandered around Mexico City sightseeing. The Museo de Antropología should be on everyone's itinerary.

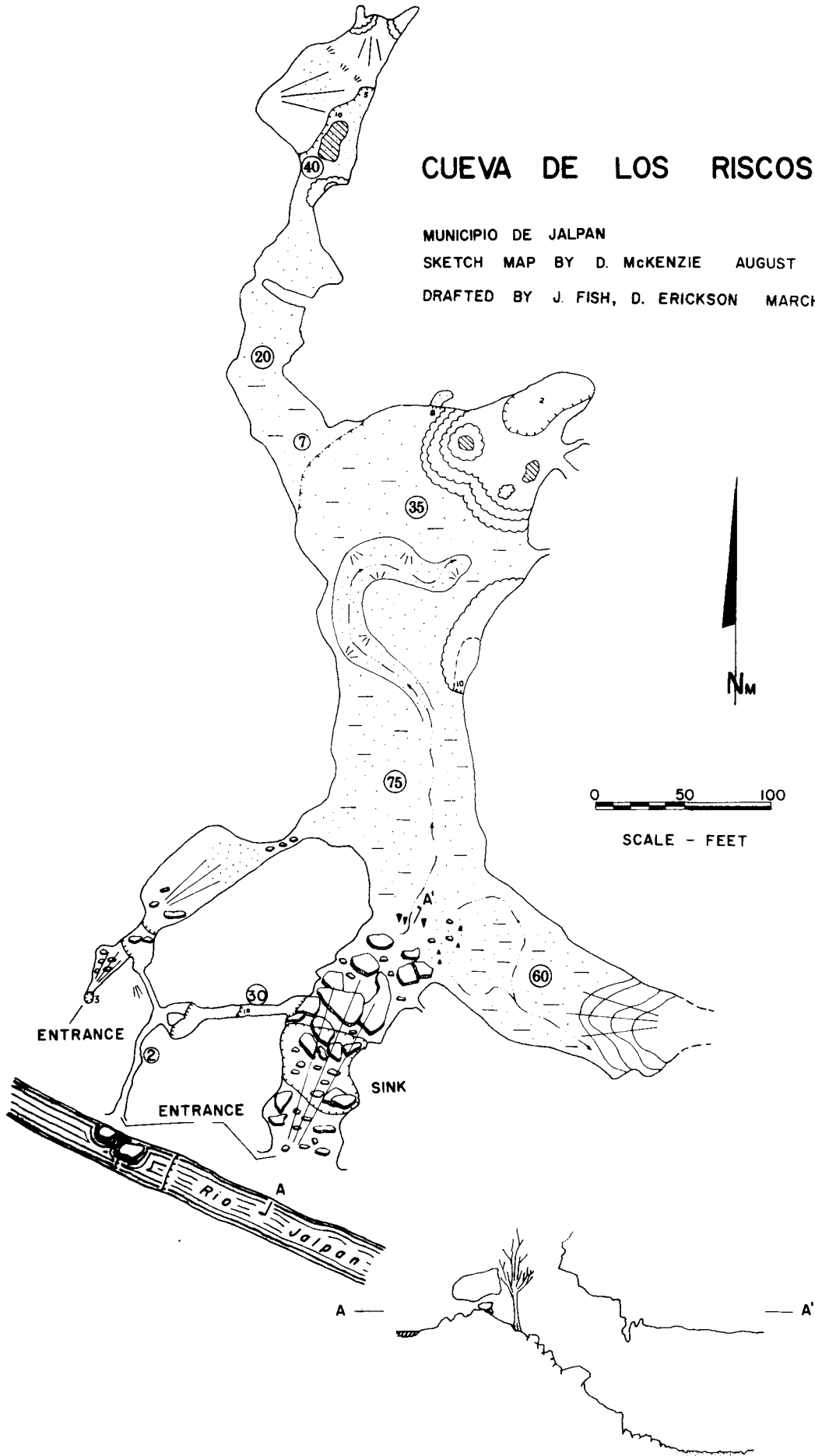
14-19 August A more complete report on the caves of Guerrero will be published in the next AMCS NEWSLETTER. Briefly, we visited Grutas de Cacahuamilpa and Dos Bocas; Grutas de Juxtlahuaca, a very large and well-decorated cave near Chilpancingo; spent a day at Acapulco; and explored part of Grutas de la Estrella. Grutas de Juxtlahuaca and Grutas de la Estrella had not previously been visited by AMCS members and are not yet fully explored. We returned to Austin on the 19th with a large number of good biological collections and a little better knowledge of several of Mexico's more important caving areas.

CUEVA DE LOS RISCOS

MUNICIPIO DE JALPAN

SKETCH MAP BY D. MCKENZIE AUGUST 1966

DRAFTED BY J. FISH, D. ERICKSON MARCH 1967



Persons: Jim and Barbara Hershberger, James Mead,
Philip Winsborough
Date: 22 July 1966
Destination: Cueva del Diablo
Reported by: Barbara Hershberger Austin, Texas

On Saturday, 22 July, Jim and Barbara Hershberger, James Mead, and Philip Winsborough entered and explored a cave, the easternmost of three on the south face of the Sierra de la Iguana, in the Sabinas Canyon about 4.1 miles west of the town of Sabinas Hidalgo, N.L.

The cave entrance, about 500 feet above the Río Sabinas, was a large, dry, dusty room with passages leading north and east. The mouth, a hole about 20 feet high and 30 feet wide, can be readily seen from the highway below. See sketch map on page 90.

On speaking with the owner of the cave property it was learned that the air in the cave was dangerous, but no specific cause was given. The group was persuaded to wear protection, consisting of cotton and handkerchiefs tied over the mouth and nose.

The east passage is a joint controlled solution fissure about 50 feet long with a small breakdown room at the end. There were a few bats in the passage and the smell of ammonia was throughout. There was also considerable dust in the passage. The main part of the cave is a joint containing three sub-parallel passages on separate levels. All four persons explored the lowest passage which is horizontally divided into two levels by breakdown. It contains a damp, dirt-guano floor and much breakdown. This level ended after about 40 feet.

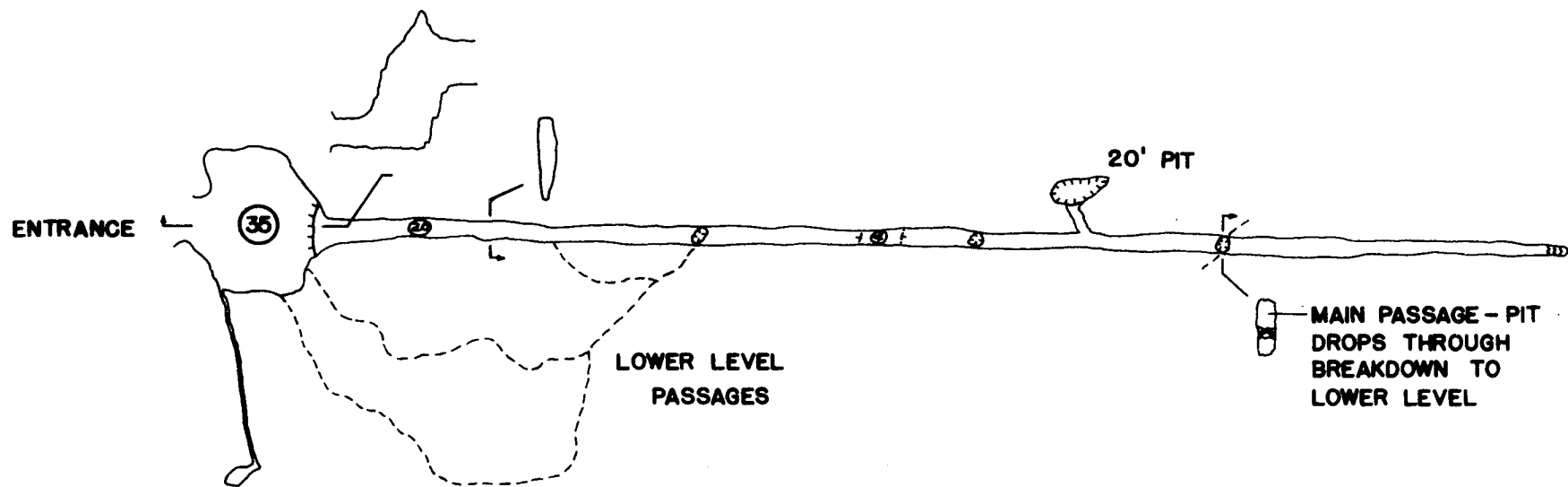
The upper passage was explored by Jim Hershberger and Jim Mead. It followed the joint for about 250 feet. This passage was cooler than the rest of the cave and active in some places. Several small rooms contained soda straws and stalactites. The floor was moist dirt. Barbara went into the upper section about twenty minutes later and met the other two almost at the back. Samples were taken of the guano at the back of the upper section and of the dirt at the entrance. These were given to Dr. Everett Rhodes of San Antonio, Texas for routine analysis in connection with his work with histoplasmosis.

From here the group went to Bustamante and to the Jarmon Ranch in the desert 26 miles west of Bustamante. They examined a bone site which contained Pleistocene elephant and camel bones. From here they returned to the Federal Park and canyon immediately west of Bustamante and climbed up to several caves near the top of the north face, opposite some Indian pictographs. The aim was to get to Boca del Diablo but a 100 foot vertical face of rotten, soft limestone stopped them.

Monday morning after arriving in Austin the cavers were told that eleven Mexicans who had been mining guano from Cueva del Diablo got sick and five died of histoplasmosis. On Wednesday, Jim Hershberger got sick and went to the doctor on Thursday. He was diagnosed as having the flu or a cold, given aspirin, and sent home. That Thursday James Mead also got sick and, like Hershberger, told the doctor about the histoplasmosis, but he was given x-rays and a skin test. The results were returned Friday and showed a positive reaction to the skin test and the fungus was visible in the lungs through the x-ray. Dr. Rhoades came from San Antonio the next morning and took blood from all four people, plus further tests. Jim Mead and Jim Hershberger were sick with the fungal disease for

several weeks. The skin tests and blood tests were also positive for Barbara but she did not get sick. Philip was positive for the skin test only.

It is advised that no one else go into the cave for any reason. There are no precautionary measures which are portable and still effective in preventing inhalation of the fungal spores. If not diagnosed and treated, the disease can be fatal.



CUEVA DEL DIABLO

MUNICIPIO DE SABINAS HIDALGO, N.L.

SKETCHMAP BY JIM MEAD

DRAFTED BY DON ERICKSON, 20 MARCH 1967

AMCS

HISTOPLASMOSIS

In 1906 an organism, Histoplasma capsulatum, was discovered and named; and the accompanying disease was called Histoplasmosis. It was originally thought to be a protozoan but later proved to be a fungus. Further studies of the organism did not take place until 1934. Much research is needed before the fungus and its effects are sufficiently understood.

Histoplasmosis is very common in the Ohio and Mississippi River Valleys and in the eastern and central United States. The fungus lives in bird, especially pigeon and starling, dung and chicken dung as well as bat guano and other soils with high organic content. Indications are that it will not grow in dry, dusty soil. The fungus is circumglobal in distribution. It is estimated that 30 million persons now living have had Histoplasmosis and one-half million new infections occur yearly in the United States. The death rate is very small, because all but a small percentage of these persons develop an effective degree of immunological resistance very early in the disease.

Histoplasma capsulatum belongs to the group of fungi called Fungi Imperfecti. It is dimorphic, growing as a filamentous mold in the soil and as a yeast in animal and human hosts. In the soil it sends out hyphae which produce chlamyospores. These are the infecting agents. They are airborne and are distributed to the dry parts of the cave where they are picked up by inhalation. They get into the lungs and germinate, producing a yeast-like asexual stage in which the fungus is in individual, small, spherical, budding, thick-walled cells 3 to 5 microns in diameter. These grow mainly in the alveoli of the lungs, where they are frequently walled off by protective calcifying agents; i.e. the same mechanism that wards off tuberculosis, though many people have positive tests for TB. If this fails the yeast cells invade the spleen, liver, and bone marrow and can cause death.

Infection is frequently recurring, usually in a mild form. Sometimes it spreads rapidly causing severe illness or death. The majority of the infections remain entirely asymptomatic, and most of the rest are mild, during which time an effective degree of immunological resistance develops. Most of these cases are never diagnosed as histoplasmosis, and spontaneous cure results with no need for therapy other than general supportive measures. Even when more severe, the outlook is usually good. Symptoms appear within five to eighteen days after exposure.

The mycosis is characterized by irregular fever, emaciation, leukopenia, anemia, and splenomegaly. There may also be papular or ulcerative skin and mucous membrane lesions. It is diagnosed by the demonstration of the fungus in mucous membrane smears, in the blood system, in bone marrow, and by skin tests.

Amphotericin B (Fungizone) is an antifungal antibiotic useful in treatment of many mycotic infections. It is produced by a strain of Streptomyces nodosus. Fungizone is the most satisfactory treatment for histoplasmosis. It is administered intravenously for an average of three months. Use of the drug, however, is obviously limited to severe cases.

Barbara Hershberger
Austin, Texas

Editor's Note: The following proposal by Orion Knox, Jr. was submitted to the School of Architecture at the University of Texas for approval. It outlines Orion's tentative plans for a required thesis necessary for the completion of a Bachelor's degree in Architecture.

PROPOSAL AND REGIONAL PLAN FOR THE
PARQUE NACIONAL DE LA GRUTA DEL PALMITO
Municipio de Bustamante, Nuevo León, México
by Orion Knox, Jr.

SCOPE:

The scope of this project will be the planning in detail of a national park, including a regional plan, and all of the facilities required for the park's operation. The primary attraction in the park will be the Gruta del Palmito, a very large cavern noted for its size and beauty. The park will also include other outstanding features of the area, notably the rugged mountains and deserts which are so characteristic of northeastern Mexico. Facilities which will be designed for the park include a visitors' center complex at the cave, information stations at the park entrances, and facilities at park camp grounds. The following topics, which include the purposes of a national park, a regional study of the site for geologic, geographic and cultural elements, a regional plan for the area and the program of the facilities to be provided in the park, are hereafter discussed.

PURPOSE OF A NATIONAL PARK:

The primary objective of creating a national park is the protection of animals, plants, and scenery to the maximum feasible extent subject to compatible visitation. This means that while parks are for people, they were created by the people in order to protect the natural elements for their esthetic, scientific, and cultural values. The second objective, which must fall within the above framework, is to provide recreation for visitors to the park and surrounding area. The type of recreation that will be provided will vary according to the characteristics of and elements located in the parks, but one objective which should be included in all such parks is the education of visitors to the natural values which the park contains. This can be accomplished through exhibits, programs, and guided tours.

Parks can be broken into three major categories: natural, historical, and recreational. A park can fall into any one or possibly all three of these categories, depending on the features it contains. The natural category may include those parks which exhibit outstanding natural scenic beauty, unusual geologic phenomena, unusual biologic phenomena, or simply a wilderness area set aside for the enjoyment of future generations and for scientific study. The historical category includes areas and places which have significance due to events which have occurred there. The recreational category is usually an integral part of the first two, to an extent ranging from a small amount to being one of the prime reasons for the park. These

three categories can also be broken down even further into six classifications that are used by the United States National Park Service. These are:

- I. High density recreation areas
- II. General outdoor recreation areas
- III. Natural environment areas (with roads)
- IV. Outstanding natural areas
- V. Primitive areas (without roads)
- VI. Historical and cultural sites

Again, these can be found in combination within the same park.

A relatively new approach to park planning, and one which park planners have found increasingly more important in their work, is the regional plan involving not only the park itself, but also the surrounding area. Considering these additional areas in a plan can coordinate and incorporate additional natural features, provide additional recreational areas and, most important, relieve some of the load on the park itself during heavy periods of visitor traffic. Another problem which has beset the parks is the provision for and the overcrowding of provisions for overnight visitors. It has become a recent policy of our national park service and has been a policy of the Mexican National Parks Service to encourage private enterprise to provide these facilities in the form of hotels, motels, etc. This will not only relieve the park management from the additional problems involved, but will also allow the park to remain in a more natural state. Camping grounds are still being provided in parks since they have less impact on the natural features.

REGIONAL STUDY:

GEOGRAPHY:

The cavern and surrounding area which I am proposing to be developed into a national park is located in the Sierra de Gomas, which lies in the northeastern state of Nuevo León, México. It will cover an area running north-south for forty-five miles and east-west for a distance of ten to eighteen miles, depending on location. Its northern border will be eighty miles southwest of Nuevo Laredo and its southern boundary will be thirty miles north of Monterrey. It will parallel the Inter-American Highway and be some fifteen miles to its west. This is an arid region typical of much of northern Mexico and of the United States southwest. There are numerous mountain ranges with deserts in between and only a few permanent rivers. Vegetation consists of arid flora of many varieties, including various species of yucca, cactus, occatillo, and desert shrubs, while higher in the mountains, especially in canyons, can be found numerous varieties of large trees including elm, oak, and palmetto. In a few of these high canyons can also be found very lush vegetation commonly associated with cloud forest regions farther to the south. Animal life in the area is much like that of our southwest, consisting of bear, lion, javelina, deer, wild burro, coyote, fox, wolf, armadillo, opossum, raccoon, jack rabbit, and numerous other species of small mammals, birds, and reptiles.

Prominent natural features which will be within the park boundaries include the Sierra de Gomas, Sierra de Carrizal, Sierra de Enmedio, a major desert area between Sierra de Gomas and Sierra de Enmedio, and the Gruta del Palmito. All of the abovementioned fauna and flora can be found within the proposed park boundaries. The only

permanent river in the area is the Río Sabinas, which runs east-west through the park bisecting the Sierra de Gomas at one point, forming a very impressive canyon. The relief in the area varies from an elevation of 2000 feet in the deserts to 7300 feet at the higher points of the Sierra de Gomas. Sierra de Carrizal reaches an elevation of 6,300 feet and Sierra de Enmedio is 6,083 feet high.

The climate of the area varies with the seasons and also with altitude. The low deserts are generally quite hot during the summer months and mild the rest of the year, except for occasional cold fronts which get far enough south to effect the area. In the higher parts of the mountains, the summer temperature is milder than at lower elevations, although the sun is still very intense in unshaded areas. During the winter the high mountains are cool and sometimes covered with a blanket of snow. Vacationing in the park will be most comfortable in the spring, fall, and winter, although the primary attraction, the cavern, can be comfortably visited any time of the year.

GEOLOGY:

The geology of the Sierra de Gomas in which the cave is located is one of deposition and later orogenic uplifting. The mountains are formed of massively bedded Cretaceous limestone which has been folded to form an anticlinal range, dipping to either side into sediment-filled valleys of a more recent period. Steep canyons have cut into the mountains at numerous points and at their base have deposited alluvial fans. It is upon one of these fans that the primary facilities and visitors' center will be proposed. The Sierra de Enmedio has a similar geologic history, but the Sierra de Carrizal is of a completely different nature. It is igneous in origin, and rather than forming a long ridge of mountains such as the previous two, it has formed a large dome-shaped mountain mass. Also located within the park boundaries are other prominent geologic features, such as hog-backed ridges and mesas.

CULTURE:

The principal centers of habitation in the region surrounding the park are Sabinas Hidalgo, Villaldama, Bustamante, Potrero, and Candela. According to the 1960 census of the state of Nuevo León, the population of these towns are: Sabinas Hidalgo, 15,425; Villaldama, 4,337; Bustamante, 2,791; and Potrero, 500.

Most of the people from Sabinas Hidalgo work as farmers and cattle ranchers, but there is a minor amount of manufacturing of brooms and women's and children's clothing. It is the most important town of the region and has two elementary schools, a high school, and a normal school; there is a church, two movie theaters, many groceries, pharmacies, hotels, restaurants, social clubs, and two public pools.

The people from Bustamante, Villaldama, and Candela are farmers and cattle ranchers, although there are others employed in the distilling of a yucca-like plant (sotol) to make an intoxicating drink and in the extraction of fiber from the lechiguilla to make cords. Each of these towns has an elementary school, a church, a hotel, and small shops of various kinds. Judicial authorities representing the federal government are located at Villaldama.

There are telegraph, telephone, post office service at each of these towns and the National Railway from Mexico City to Nuevo Laredo traverses the entire area and has stations for or at Potrero,

Villaldama, Bustamante, and Candela.

At present there is a highway from Sabinas Hidalgo, on Mexico 85, to Villaldama and Bustamante and another highway which is soon to be completed that will parallel the railroad and form a new link between Nuevo Laredo and Monterrey.

REGIONAL PLAN:

The location of the Parque Nacional de la Gruta del Palmito would have many advantages as far as accessibility, due to the proximity of the Inter-American Highway (Mexico 85) and Mexico 57, which is also a primary route from the U.S. to Mexico City. There are also large population centers near enough to the park to provide weekend recreational enjoyment. Monterrey would be located thirty miles to the south of the southern end of the park and sixty miles from the cavern and visitors' center. Saltillo would be only fifty-five miles further. Monclova would be sixty miles west of the park and Nuevo Laredo and Laredo would be one hundred miles to the northeast. Other major population centers which would be within six hours driving distance would be Tampico, Ciudad Victoria, San Luis Potosí, Zacatecas, Durango, Torreón, Matamoros, Brownsville, Corpus Christi, and San Antonio, all of which have populations of 100,000 or more.

Due to the nature of a developed cave, people could come to the park and visit only the cavern, or they could spend more time in the area and take advantage of the many other features the park would provide. This short-visit potential offered by the cavern would attract many people traveling on Mexico 85 and Mexico 57. Its close proximity to the U.S. would provide a good opportunity for many people who would like to visit Mexico, but who do not care to travel deep into the country. In this respect there might be an agreement made between the U.S. and Mexican governments to permit free travel between the U.S. and the park by way of the Nuevo Laredo-Bustamante highway and to provide check points at the other exits to the park to prevent illegal entry into the country. A similar proposal is being considered for the proposed Big Bend International Park in west Texas and northern Coahuila.

The U.S. National Park Service has classified park visitors into three categories, all of which would use this proposed park. They are:

- A. Residents adjacent to park area whose visit does not involve overnight stay when recreation area visited, usually a day trip.
- B. People four to six hours driving distance from park, usually having a set destination where one or two nights will be spent. They may participate in several recreational activities, but usually stay close to their overnight stopping place.
- C. People who reside a considerable distance from the recreational region. They will usually spend one or two nights at different locations in the recreational region.

The concept which I propose is a multi-purpose use of the park, incorporating as many of the park features as possible and using them to their maximum potential. The proposed activities and aims of the park are as follows:

Develop the cavern and an access to its entrance. The entrance is some 1,200 feet above the area where the visitors' center will be located and will require a cable car system to transport people from the center to the cavern entrance. The ride will provide visitors with a spectacular view of the canyons and the desert beyond. The cave itself will be developed so as to exhibit and protect its natural beauty to the maximum extent possible. Trails are to be entirely ramped with no steps or stairs. This allows the visitor the opportunity to see the cave rather than having to watch his step while moving on the tour. All lighting will be indirect, and all wires and fixtures will be concealed. The exit from the cave will be through a tunnel at the rear of the cave into an adjoining canyon, where another cable car will return visitors to the center.

Another feature to be provided at the visitors' center is a cable car ride to the top of Cabeza de León, the highest peak in the surrounding area. From here can be had a spectacular view of the mountains, canyons, and deserts below.

The park's visitors' center is to be located at the base of the mountain below the cavern. It will provide an educational program through the use of exhibits, lectures, and displays, in order to acquaint the visitor with the park and what it has to offer. It will also provide for a fuller understanding of what it has to offer. A stop at the center before touring the park would best be done. The center will also provide a restaurant, curio shop, observation deck, and other facilities for the visitor. It will serve as the headquarters for the park administration, and contain the offices of the administrators, as well as storage areas for machinery and supplies used in the park.

Located in the same general area as the visitors' center will be the residential facilities for the park rangers and administrators. There will be relatively few rangers required to oversee the park and some of these will live near their posts, such as the information centers at the park entrances.

All of the above activities will form the heart of the recreational facilities in the park and could be classified as Type I or high density recreation area.

Two other high density areas are planned for the park, one in the canyon to the northwest of the visitors' center, on the Río Sabinas, and the other in a closed canyon on the eastern side of the Sierra de Gomas about ten miles south of the center. Both are to be camp areas which include shelters and restroom facilities. The latter will have a stable to provide horses for riding on the nature trails in the area.

Information centers will be provided at park entrances to give information to visitors, inform them of availability of camping areas, and control flow of traffic. Although small in scope, these centers will perform a very important function in the management of the park.

Within the park itself a system of roads will be provided to various points of interest and scenic beauty. This will occur primarily on the desert and foothills, as the mountains are too rugged for a road to be constructed.

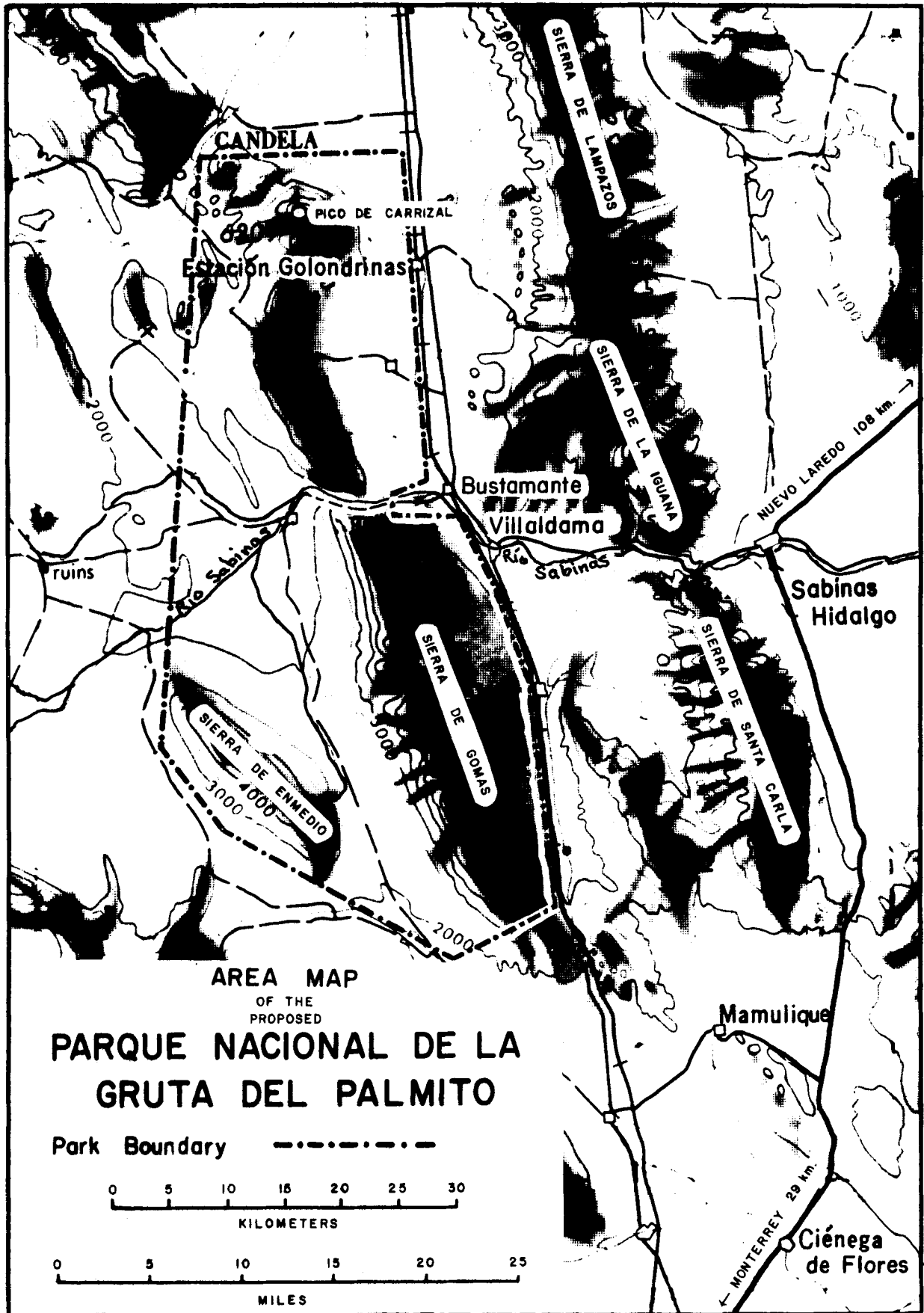
A public transportation system will be provided to transport people from a central gathering point, the visitors' center, to the major features of the park on a shuttle basis. They could remain on one coach and tour the entire park, or could stop at locations of interest to them and catch a later coach back. The value of this

would be twofold; first and most important, it would lessen the amount of private auto traffic on the park roads, and second, it would provide a means for those who come by train or bus to get around the park. This is especially necessary in Mexico because the majority of travel done by Mexicans is by bus and train.

The last concept which is proposed is for the government to acquire the land for the park, but to allow the ranching establishments located in the desert between Sierra de Gomas and Sierra de Enmedio to continue their operations as in the past. They would be prohibited from setting up any commercial establishments, thus keeping the ethnic character so typical of the desert ranching regions of Mexico.

With the park itself providing only facilities for campers and day visitors, there will have to be a cooperative effort among the towns that border the park, the state and federal governments, and the park administration to plan and finance public accommodations, such as hotels and motels in these towns. This should be closely coordinated to insure a high quality and the retention of the present Spanish character of the area. These facilities will provide an economic impact to the area, which will benefit the entire region.

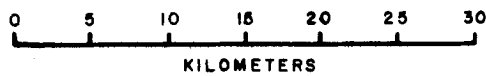
As was stated in the scope, this project will include the design and coordination of the facilities within the park boundaries. Upon final and satisfactory completion of this proposal and plan, it will be submitted to the Mexican government in order to stimulate an interest in the area for such a project.



AREA MAP
OF THE
PROPOSED

PARQUE NACIONAL DE LA GRUTA DEL PALMITO

Park Boundary



THE ORDER RICINULEI IN MEXICAN CAVES

by James Reddell
Austin, Texas

The Order Ricinulei is an unusual order of arachnids, regarded by most authorities to be the rarest of all arthropods. Although superficially resembling ticks and moving in much the same way as ticks do, they possess a number of characteristics which set them apart from all other living arachnids. They also represent a group far more abundant in the Carboniferous than today. All species lack true eyes and possess a hood, the cucullus, which fits down tightly over the chelicerae. A complicated copulatory apparatus on the third leg of the male is believed to aid in the transfer of the spermatophore to the female during mating. This has not, however, ever been observed.

Although described in 1838 by Guerin-Meneville from specimens taken in Africa, the order, in 1939, was represented in published accounts by only thirty-five specimens. The order is divided into two genera, Ricinoides in Africa and Cryptocellus in the Americas. H. W. Bate in a famed trip to the Amazon in 1861 collected the first American species, described as Cryptocellus foedus. Since that time additional species have been taken in other parts of South and Central America. One species, C. dorotheae Gertsch and Mulaik, has been described from the United States. It was found beneath sheet iron and other permanent cover at Edinburg, Texas, in 1939.

Chamberlin and Ivie (1938) described C. pearsei on the basis of two specimens in Balaam Canche Cave and Oxolodt Cave, Yucatan. This was the first species to be reported from a cave and the first Mexican species to be described. In 1941 C. Bolívar y Pieltain described C. boneti from Grutas de Cacahuamilpa, Guerrero (see figure, page 101). His description was based on two males taken in the end room of the cave. Yet a third species, C. osorioi, was described from a cave in 1946 (Bolívar y Pieltain, 1946). This species was described from Cueva de los Sabinos and was represented by eight specimens. One other Mexican species has been described. This is Cryptocellus spinotibialis described from a surface locality at Finca Guatimoc, Chiapas (Goodnight and Goodnight, 1952).

Despite the discovery of several hundred specimens of an African species of ricinulid the order in America has remained quite rare and probably less than one hundred specimens have ever been reported in the literature on the order. When compared with other orders, such as the mites and spiders, this is quite amazing. Several arachnologists have stated that the discovery of a single specimen of this order is an "event". It was with great shock that David McKenzie and I discovered that the "ticks" collected from Cueva de Taninul n. 1, Ciudad Valles, San Luis Potosí, were in this phenomenally rare group of animals. Even more exciting was the news that not only were specimens of Cryptocellus osorioi found but also specimens belonging to an undescribed species. Collected on June 7, 1964, only about ten individuals were taken. On January 24, 1965, Terry Raines collected a few specimens of C. osorioi in Sótano del Venadito, Tamaulipas, making this the only known species to be reported from more than two localities. In August 1964 Bill Russell found several specimens in a moist area near the end of Cueva de los Riscos, Durango. The appearance of this order in Durango, a desert

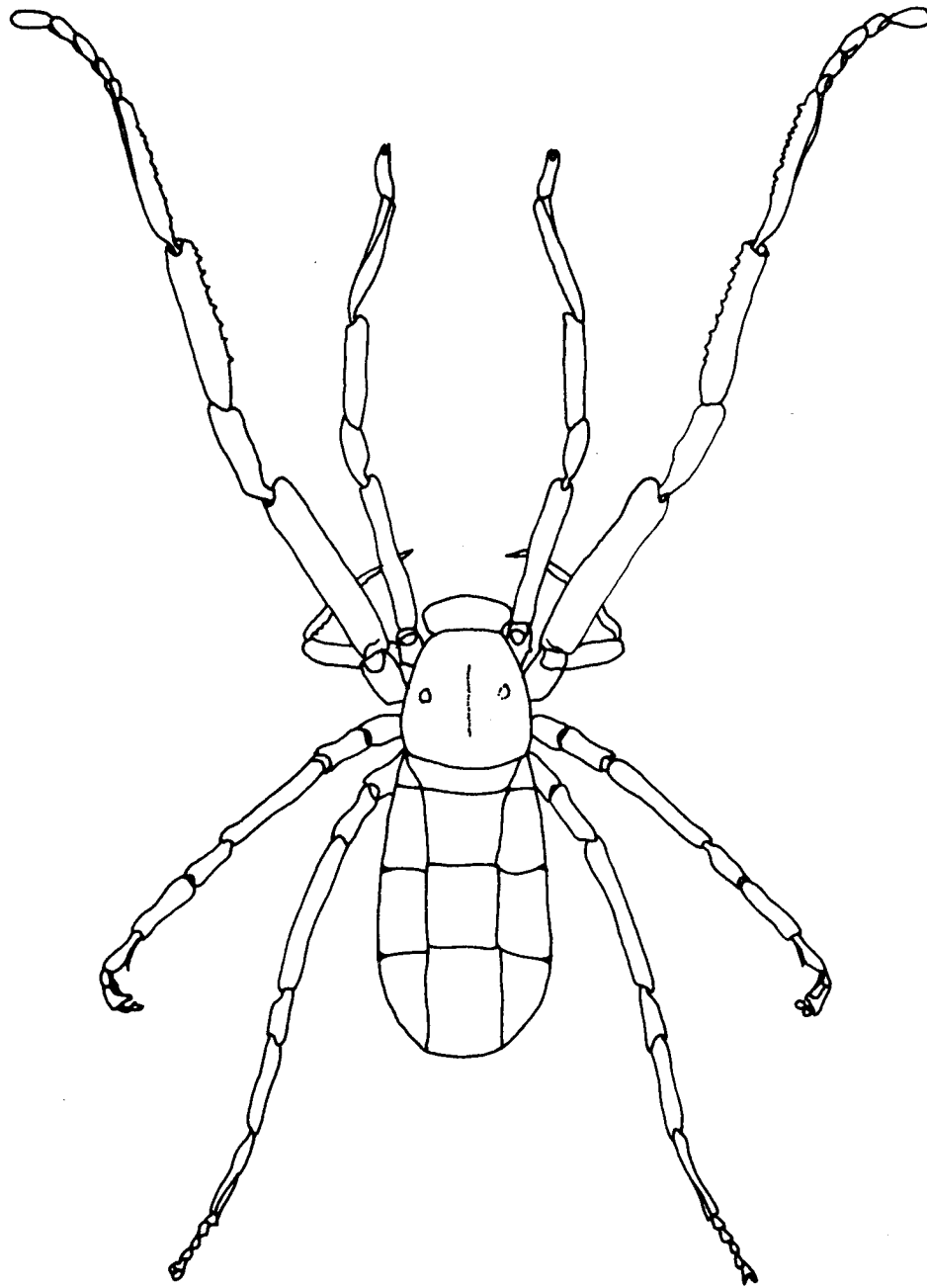
area, was rather surprising, since it was previously known only from moist tropical or semi-tropical areas. The Cueva de los Riscos specimens proved to be a second undescribed species. In August 1965 John Fish, William Bell, and James Reddell visited Grutas de Caca-huamilpa. About fifteen specimens of *C. boneti* were collected from off of flowstone in the terminal room of the cave, making this a reasonably well-known species. A trip back to this room in August 1966 by John Fish, Janie Reddell saw another fifteen specimens collected. Meanwhile on February 24, 1966, Bill Bell and James Reddell discovered a third undescribed species in Cueva del Guano, Durango, collecting about fifteen specimens. In three years as many specimens were collected as had probably been taken in the previous one hundred years. Later trips to Cueva de Taninul n. 1 by Robert W. Mitchell of Texas Technological College have resulted in the capture of over one hundred live specimens, which are now under study. It has, therefore, become apparent that caves in Mexico are among the richest sources for obtaining this rare group of animals.

It is not known if the species taken in caves are definitely restricted to caves or if they may also eventually be found in moist surface situations. Since the order characteristically lacks eyes this cannot be used to determine possible adaptation to the cave habitat. The cave forms do appear to have slightly longer and more slender legs, a common cave adaptation. Certainly the species taken in the caves of Durango may be expected to represent relicts of once-widespread species which survived the drier climate by retreat into caves.

Collectors in Mexico have a unique opportunity to see and to collect this fascinating group of animals. Under no circumstances should specimens taken in caves be retained for personal collections. If it is from a new locality it is probably a new species and should be studied by an expert to determine this. The order is usually found crawling on cave floors or walls or, rarely, on organic debris. Any tick-like animal should be collected on the chance that it is one of these animals. If it turns out to be a tick, it is even then probably of interest since many new and rare species of tick await collection in Mexican caves. They can be preserved in 70 per cent isopropyl (rubbing) alcohol and should be sent to the author in care of the Association for Mexican Cave Studies.

References

- Bolívar y Pieltain, C. 1941. "Estudio de un ricinulideo de la Caverna de Cacahuamilpa, Guerrero, Mex. (Arachnida)." *Rev. Soc. Mex. Hist. Nat.*, 2(2-3):197-209, lam. XI.
- Bolívar y Pieltain, C. 1946. "Hallazgo de un nuevo ricinulideo en el Mexico central (Arach.)." *Ciencia*, 7(1-3):24-28.
- Chamberlin, Ralph V., and Wilton Ivie. 1938. "Arachnida of the orders Pedipalpida, Scorpionida and Ricinulida." *Carnegie Inst. Washington Publ.*, 491:101-107.
- Gertsch, W. J., and S. Mulaik. 1939. "Report on a new ricinuleid from Texas." *Amer. Mus. Nov.*, 1037. 5ppp.
- Goodnight, Clarence J., and Marie L. Goodnight. 1952. "A new ricinulid from Chiapas, Mexico (Arachnoidea, Ricinulei)." *Amer. Mus. Nov.*, 1583. 5 pp.



Outline tracing of a ricinulid, *Cryptocellus boneti*,
from Grutas de Cacahuamilpa, Guerrero, Mexico

MEXICAN CAVE BIOLOGY: ANNOTATED BIBLIOGRAPHY

by James Reddell
Austin, Texas

1. Barr, Thomas C., Jr. 1966. "New species of Mexisphodrus from Mexican caves (Coleoptera: Carabidae)." Psyche, 73(2):112-115. Mexisphodrus tlamayaensis n.sp. is described from Sótano de Tlamaya, San Luis Potosí, and M. profundus n.sp. is described from Sótano de la Joya de Salas and a "sinkhole at Rancho del Cielo," Tamaulipas. Both are probably troglophiles, but M. profundus is considered to be an "incipient troglobite," with reduced wings, eyes, and pigmentation.
2. Bolívar y Pieltain, C. 1952. "Un Ozaeninae troglófilo de la Cueva de Los Sabinos, Ciudad Valles, San Luis Potosí (Mexico)." Ciencia, 11(10-12):295-296.
A troglophilic carabid of the subfamily Ozaeninae, Pachyteles urrutiai n.sp., is described on the basis of one male and one female collected in Cueva de Los Sabinos, San Luis Potosí, Mexico. This subfamily is small and no North American cave records have been previously published for it.
3. Bolívar y Pieltain, C., and J. Hendrichs. 1964. "Agoninos cavernícolas nuevos del género Rhadine de Nuevo León, Coahuila y San Luis Potosí (Mexico) (Col., Carab.)." Ciencia, 23(1):5-16, lam.I.
Four new species of beetle of the genus Rhadine are described from Mexican caves: R. rotgeri n.sp. from Gruta de Cuevacillas, Coahuila; R. medellini n.sp. from Cueva Carnicero, Maroma, San Luis Potosí; R. pelaezi n.sp. from Cueva García, Nuevo León; and R. boneti n.sp. from Cueva de La Boca, Nuevo León. The two Texas cave species, R. howdeni and R. babcocki are considered to be subspecies of R. araijai, known only from Gruta del Palmito, Nuevo León. A key to the cavernicolous Rhadine is provided.
4. Bolívar y Pieltain, C., and J. Hendrichs. 1965. "Los Carabidae de la Gruta de Cacahuamilpa (Mexico) con descripción de Agonum (Platynus) bilimeki n.sp. y de su larva (Ins., Col.)." Ciencia, 23(6):225-232, lam. V.
The adult and larva of Agonum (Platynus) bilimeki n.sp. are described from Gruta de Cacahuamilpa. The carabid beetle, Bembidium unistriatum, also from Gruta de Cacahuamilpa, is redescribed and removed to the genus Tachys (Tachyura). The first species is also recorded from Gruta de Acuitlapan, Guerrero; the latter is also recorded from Gruta de la Estrella, Mexico.
5. Cole, Gerald a., and W. L. Minckley. 1966. "Speocirolana thermydronis, a new species of cirolanid isopod crustacean from central Coahuila, Mexico." Tulane Studies in Zool., 13(1):17-22.
Speocirolana thermydronis n.sp. is described from a thermal spring at Cuatro Ciéngas, Coahuila. A pre-Tertiary origin is postulated for the genus. This blind species is troglotic and is an extension of the range of the genus from southern Tamaulipas.
6. Constantine, Denny G. 1966. "New bat locality records from Oaxaca, Arizona, and Colorado." J. Mammal., 47(1):125-126.
This paper includes the following bat records from caves in Oaxaca: Chrotopterus auritus auritus, Mimon cozumelae, and Lonchorhina aurita aurita.

7. Davis, William B. 1965. "Review of the Eptesicus brasiliensis complex in Middle America with the description of a new subspecies from Costa Rica." *J. Mammal.*, 46(2):229-240.
This paper includes a record of Eptesicus gaumeri gaumeri in Cueva del Salitre, Morelos.
8. Davis, William B., Dillford C. Carter, and Ronald H. Pine. 1964. "Noteworthy records of Mexican and Central American bats." *J. Mammal.*, 45(3):375-387.
This paper includes records of the following bats in Mexican caves: Pteronotus suapurensis suapurensis from Cueva Laguna Encantada, 3 km. ENE San Andrés Tuxtla, Chiapas; Chrotopterus auritus from Zapaluta Cave, 1.3 mi. SSE Zapaluta, Chiapas; Leptonycteris sanborni from a cave 7 mi. WSW Ocozocoautla, Chiapas; Artibeus toltecus from Cerro Hueco Cave, 2 mi. SE Tuxtla Gutiérrez, Chiapas; and Artibeus aztecus from Zapaluta Cave, Chiapas. These all represent the first record for the state of Chiapas.
9. Jones, J. Knox, Jr. 1964. "Additional records of mammals from Durango, Mexico." *Trans. Kansas Acad. Sci.*, 66(4):750-753.
The bat, Glossophaga soricina leachii, is reported from a small cave at Santa Ana, Durango.
10. Jones, J. Knox, Jr. 1964. "Bats from western and southern Mexico." *Trans. Kansas Acad. Sci.*, 67(3):509-516.
This report includes a range extension for Eptesicus brasiliensis propinquus into Jalisco from Cuevo del Salitre, Morelos.
11. Mitchell, Henry A. 1965. "Investigations of the cave atmosphere of a Mexican bat colony." *J. Mammal.*, 45(4):568-577.
This presents the results of a study of the atmosphere of Cueva del Tigre, 14.9 mi. SSW Carbo, Sonora, Mexico, a lava cave which acts as a day roost for large colonies of bats, particularly Tadarida brasiliensis mexicana. The cave is described, a list of fauna is given, and an account of its atmosphere presented. The temperature of the cave ranges from 30°-35°C, the humidity from 60 to 82 per cent, and the ammonia concentration from 2.00 to 18.50 ppm. Ammonia concentration was highest in August and, though not lethal to man, was sufficient to produce extreme respiratory distress.
12. Mitchell, Henry A., and Clare D. Smith. 1966. "Anomalous tails in Tadarida brasiliensis." *J. Mammal.*, 47(1):148-149.
Bats of the species Tadarida brasiliensis with abnormal tails are reported from Cueva del Tigre, 14.9 mi. SSW Carbo, Sonora, Mexico.
13. Novick, Alvin, and Juozas R. Vaisnys. 1964. "Echolocation of flying insects by the bat, Chilonycteris parnellii." *Biol. Bull.* 127(3): 478-488.
This study of echolocation by Chilonycteris parnellii included specimens obtained in Cueva del Salitre, Morelos.
14. Rabb, George B. 1965. "A new salamander of the genus Chiropterotriton (Caudata: Plethodontidae) from Mexico." *Breviora*, 235. 8 pp.
Chiropterotriton magnipes n.sp. is described from Cueva de Potrerillos, Ahuacatlán, San Luis Potosí. The species is remarkable in possessing large webbed feet similar to those of the genus Bolitoglossa.

15. Reddell, James R. 1965. "A checklist of the cave fauna of Texas. I. The Invertebrata (exclusive of Insecta)." *Tex. J. Sci.*, 17(2):143-187.
This survey of Texas cave fauna includes a record of the isopod, Venezillo tanneri (Mulaik and Mulaik), in Gruta del Palmito, Nuevo León.
16. Reddell, James R. 1966. "A checklist of the cave fauna of Texas. II. Insecta." *Tex. J. Sci.*, 18(1):25-56.
This survey of Texas insect cave fauna includes a record of the alleculid beetle, Lobopoda subcuneata Dasey, in Sótano del Pozo, San Luis Potosí; of the carabid beetle, Tachys (Tachys) proximus Say, in Cueva de los Lagos, Coahuila; of the staphylinid beetle, Biocrypta magnolia Blatchley, in Sótano del Arroyo, San Luis Potosí; and of the tenebrionid beetle, Eleodes hispilabris (Say), in Cueva de los Lagos, Coahuila.
17. Rehder, Harald A. 1966. "The non-marine mollusks of Quintana Roo, Mexico with the description of a new species of Drymaeus (Pulmonata: Bulimulidae)." *Proc. Biol. Soc. Wash.*, 79:273-296.
Seven species of snail are reported from under leaf mold in a sink on the Isla de Cozumel, Mexico. It is not recorded if these were taken alive or as shells.
18. Vandel, A. 1965. "Sur l'existence d'Oniscoides très primitifs menant une vie aquatique et sur le polyphylétisme des Isopodes terrestres." *Anal. Spéléol.*, 20(4):489-518.
A primitive oniscoid isopod, Cantabroniscus primitivus n.gen. et n.sp., is described from a cave in Spain. It is exclusively aquatic and is closely related to the only other known aquatic oniscoid isopod, Typhlotricholigioides aquaticus, known only from Cueva de Ojo de Agua Grande, Veracruz. The two forms are discussed and compared in detail.
19. Walker, Charles F. 1955. "A new salamander of the genus Pseudoeurycea from Tamaulipas." *Occ. Papers Mus. Zool. Univ. Michigan*, 567. 8 pp., 1 plate.
Pseudoeurycea scandens n.sp. is described from the walls of a cave at Rancho del Cielo, Tamaulipas, Mexico. The species is also recorded from beneath rocks and logs in humid forest near Rancho del Cielo. This is the most common salamander in this area and is usually found in caves.

... and it was great, as I rappelled down the last 76 foot drop into the Entrance Room. Just like that first time Benny, Bill, Rooney, and I had gone into the cave; the smooth, clean limestone walls, the many polished solution pockets, and the feeling of being the first to explore in an unknown sótano. But my thoughts crashed as I stared back at an automobile headlight...

I remember when T. R. Evans, James Reddell, Bill Russell and I were the first cavers from the University of Texas ever to visit the Xilitla area. We had heard of a six second pit and it was our intention to visit it. Most of our first day was spent obtaining a letter of introduction from the Presidente del Municipio de Xilitla. We also learned that the pit we sought was located on the Rancho de Huitzmolotitla, owned by Sr. Modesto Gómez. Hitch-hiking a ride to the Tlamaya turnoff, we hiked the remaining two miles through dense fog. At the ranch we were greeted by Sr. Gómez with such a warm display of hospitality so typical of Mexico that we were sincerely honored to stay at his ranch.

Since our first trip things have changed. As the people of Tlamaya got to know us we no longer had to spend valuable time obtaining the letter of introduction. At first some of them had never even seen a "gringo", and were naturally a bit uneasy. But as we always acted with the utmost respect and friendliness they soon never hesitated to guide us to the nearest sótano or cueva, asking nothing in return. Then, as the news of the discovery of a cave called Sótano de Tlamaya spread throughout the United States, cavers from every direction became excited and started seeing Tlamaya for themselves. This was all fine and good, as all were serious-minded cavers ... except a few. This latter group of "unfortunates" chose to flaunt their wealth, to display no respect or courtesy towards the local people, and even to intoxicate themselves to the point of annoying those whom they were with.

And conditions became no better in the caves. Some cavers, like most people, are not content with spreading their garbage all over the U.S.A., but insist on discovering new dumps abroad. This was the case in Sótano de Tlamaya. On our last trip we encountered Clorox bottles, waste carbide, air mattresses, plastic bags, empty cans, deteriorated sleeping bags, and even an automobile headlight; all of which the monster called "expedition" excretes as he gropes his way through the cave. It certainly is disgusting to think that National Speleological Society members, with their "leave nothing but footprints" motto, are to blame. So much for conservation - you get the point.

Looking to the future, if those responsible (and those who will be responsible) do not mend their ways both public relations and the caves of the Xilitla area, or any areas visited by cavers, will within a few short years be ruined for all who follow. In closing, it's perhaps trite but necessary to say that, "A hint to the wise is sufficient".

Terry W. Raines
Austin, Texas

THE ASSOCIATION FOR
MEXICAN CAVE STUDIES

NEWSLETTER

TRIP REPORTS

Gruta del Palmito, Nuevo Leon

CAVE MAPS

CAVES OF GUERRERO AND MORELOS

BIOLOGY SECTION

The Millipedes in the Caves of Mexico and Guatemala
Mexican Cave Biology: Annotated Bibliography

THE ASSOCIATION FOR MEXICAN CAVE STUDIES
NEWSLETTER

Volume II Number 5

September - October 1966

Publication date: January, 1968

The AMCS NEWSLETTER is published six times a year by the Association for Mexican Cave Studies, P.O. Box 7672, University Station, Austin, Texas, 78712, USA. The Association for Mexican Cave Studies is a nonprofit organization whose goals are the collection and dissemination of information concerning Mexican caves. Membership is open to all interested persons at a rate of \$5.00 US currency for the calendar year, with memberships starting at the first of each year. Persons joining after the first of the year will receive all publications for that year. Publications for the year of 1965 are still available for \$6.00 US by writing to the AMCS.

Members are urged to submit articles for publication. The article may cover any phase of Mexican speleology. Trip reports are requested from all trips.

Editor..... Terry W. Raines
Assistant Editor..... John Fish
Treasurer..... Philip Winsborough

NEWS NOTES

- If you were a 1965 member of the AMCS or made a special order you should now have in your possession AMCS BULLETIN NO. 1, "Caves of the Inter-American Highway". After reading over the pages of descriptions, maps, and photos you may be inclined to believe that the BULLETIN is a complete guide to the caves along Mexico 85, but this is not at all true. In fact, even as your BULLETIN was traveling through the mails new caves were being explored. Our knowledge of the caving regions is continually enlarging. Also changing are the important landmarks such as kilometer posts, which are moved northward as a new highway takes a shortcut. To keep informed on all these new discoveries and changes we need your help. Take your BULLETIN to Mexico and note the new caves you explore. It is important that you make an accurate description and location of each cave so that correct records may be maintained. At the same time you can check on the kilometer posts and record any other information that should be included in the BULLETIN. If the demand warrants it, a second and revised edition will be published.

TABLE OF CONTENTS

NEWS NOTES	106
TRIP REPORTS	
Gruta del Palmito	108
CAVE MAPS	109
CAVES OF GUERRERO AND MORELOS	111
by John Fish	
BIOLOGY SECTION	
The Millipedes in the Caves of Mexico and Guatemala	124
by Nell B. Causey	
Mexican Cave Biology: Annotated Bibliography	125
by James Reddell	

ILLUSTRATIONS

Cretaceous Formations of Guerrero and Morelos, Mexico	114
Grutas de Cacahuamilpa	116
Grutas de la Estrella	120

TRIP REPORTS

Persons: Terry Plemons, Terry Raines, Judy Sustare, Cindy Tracy,
Jeannie Wiggins

Date: 30 September-2 October 1966

Destination: Gruta del Palmito, Nuevo León

Reported by: Terry Raines Austin, Texas

We left Austin, drove through the night, and camped beside the road just west of Sabinas Hidalgo. Four hours later we were awakened by the early morning sun and from the campsite we continued on through the town of Bustamante to the base of the mountains to the west, the Sierra de Gomas. We parked at the upper end of a large area which had been cleared to provide parking space for one of the field trips during the 1964 National Speleological Society Convention at New Braunfels, Texas. The destination of our trip was Gruta del Palmito, where we planned to sketch a longitudinal profile of the cave, make additional sketches for the existing map, and check out some small passages at the very bottom of the cave.

From the parking lot a hike up a trail having approximately 50 switch-backs is necessary. Although the trail length is very close to one mile, the change in elevation is about 1100 feet. At the entrance we checked over the gear, which included, besides the regular surveying equipment, a bottle of compressed helium with which we planned to inflate balloons. Once inside the cave we could raise the balloons until they reached the ceiling, measure the length of the string, and thus have an accurate measurement of the ceiling height. The only problem in our system, which we quickly discovered, was that the helium bottle was empty. Undaunted, we headed into the cave. Sketching was slow as the cave is very large (averaging 75 feet high, 200 feet wide, and over 2000 feet long) but we eventually reached the last large room. Here the girls waited while Terry and I descended (climbed) into some of the small, lower passages. We checked them to the very bottom and made a rough sketch before returning. On the way out additional cross-sections were sketched. By the middle of the afternoon we were driving back to Bustamante where we stopped long enough to be refreshed before continuing along another dirt road to the northwest. This road led us to Cañón de Bustamante, about ten miles from the town, where we camped that night by a stream.

Sunday morning we drove on west through the canyon, which cuts completely through the Sierra de Gomas. Because of the many trees and the stream, the government has declared it a Federal Park. There are no formal accommodations, but camping is excellent along the stream for those visiting the Bustamante area. As we drove west the road became very rough, with water from the stream running down the middle in several places. After an estimated five miles we emerged on the west side of the range and stopped at the entrance to a ranch called "Las Vacas". From where we stood we could see many miles to the west, where several more ranges of mountains rose out of the desert. Lack of time did not permit us to continue and we returned to Austin.

CAVE MAPS

During the past six years the AMCS has been continually enlarging its file of cave maps and now wishes to make them easily available at cost to its membership. Copies of the maps may be divided into two categories according to the method of reproduction. Ozalid copies are the same size as the original ink tracing. In Table 1 is found a listing of cave maps available in this form along with the size of the map and the number of square feet each map contains. When calculating the cost of the maps you have ordered, find the total number of square feet then consult Table 2. Offset printed copies of cave maps are also available, many of which are reductions of the larger maps in Table 1. These smaller sheets are all to be found in AMCS BULLETIN NO. 1, "Caves of the Inter-American Highway". Cost of the black-and-white maps is \$0.10 each while the multicolored maps (including area maps) are sold for \$0.25. Postage is 10% of the total order with a minimum of \$0.05 and a maximum of \$0.50.

Table 1. Surveyed caves with available maps as of January, 1968.

CAVE NAME	SIZE (inches)	AREA (sq. ft.)
Cueva de El Abra	24 x 36	6
Sótano del Arroyo	24 x 36	6
Cueva de La Boca	18 x 24	3
Gruta de Carrizal	30 x 36	7.5
Cueva de Cuesta Blanca	24 x 24	4
Pozo de Gavilán	24 x 30	5
Sótano de Huitzmolotitla	36 x 120	30
Sótano de La Joya de Salas	24 x 36	6
Sótano de Montecillos	18 x 24	3
Cueva del Pachón	18 x 30	4
Gruta del Palmito		
(plan)	36 x 48	12
(profile)	36 x 60	15
Sótano del Pozo	18 x 24	3
Grutas de Quintero	24 x 24	4
Cueva de los Riscos	12 x 18	1.5
Cueva del Salitre	18 x 24	3
Sótano de San Antonio	12 x 18	1.5
Cueva de la Selva	18 x 24	3
Cueva de Taninul n. 4	12 x 24	2
Sótano de la Tinaja	36 x 48	12
Cueva de Tlamaya	18 x 24	3
Sótano de Tlamaya		
(profile to -1000 feet)	36 x 48	12
Ventana Jabalf	18 x 24	3

Table 2. Prices of Ozalid copies.

sq.ft.	cost	sq.ft.	cost	sq.ft.	cost
2	\$.87	35	\$3.80	68	\$6.50
3	.98	36	3.88	69	6.58
4	1.08	37	3.97	70	6.65
5	1.15	38	4.06	71	6.73
6	1.21	39	4.15	72	6.81
7	1.28	40	4.24	73	6.89
8	1.36	41	4.32	74	6.96
9	1.45	42	4.41	75	7.03
10	1.54	43	4.50	76	7.11
11	1.63	44	4.59	77	7.18
12	1.72	45	4.68	78	7.26
13	1.80	46	4.77	79	7.34
14	1.89	47	4.86	80	7.41
15	1.98	48	4.95	81	7.49
16	2.07	49	5.04	82	7.57
17	2.16	50	5.13	83	7.65
18	2.24	51	5.21	84	7.72
19	2.33	52	5.29	85	7.79
20	2.42	53	5.37	86	7.87
21	2.51	54	5.45	87	7.94
22	2.60	55	5.51	88	8.02
23	2.68	56	5.59	89	8.10
24	2.78	57	5.67	90	8.17
25	2.88	58	5.74	91	8.25
26	2.98	59	5.82	92	8.33
27	3.07	60	5.90	93	8.40
28	3.16	61	5.97	94	8.48
29	3.26	62	6.05	95	8.55
30	3.34	63	6.13	96	8.62
31	3.44	64	6.20	97	8.70
32	3.53	65	6.27	98	8.78
33	3.62	66	6.35	99	8.86
34	3.71	67	6.42	100	8.93

101 to 300 .07

301 to 500 .06

CAVES OF GUERRERO AND MORELOS

JOHN FISH

Assistant Editor

INTRODUCTION

At the present time little is known about the caves in the states of Guerrero and Morelos, other than the spectacular legendary caves such as Grutas de Cacahuamilpa, Dos Bocas, and Pozo Meléndez (Boca del Diablo). Even these famous caves are poorly known, with rumors of miles of passages and tales of people being lost in them for days.

This report was written to present the limited information we have, list as leads the known caves not yet visited by AMCS members, and hopefully to entice members to cave-hunt and map in this major caving region. A map showing the outcrop areas of the lower Cretaceous rocks (mostly good cave-forming limestones) and upper Cretaceous rocks and cave locations is included as an aid for cave hunting and location.

GEOGRAPHY

Atlas Porrúa shows the climate of Guerrero and Morelos to be mostly a tropical savanna with seasonal heavy rains in the summer and virtually no rain the remainder of the year. Camino de México (probably the best low-priced set of maps of Mexico) divides the area into three geographic provinces: 1) Sierra Madre del Sur; 2) Balsas Depression; and 3) Transverse Volcanic Belt. The Sierra Madre del Sur is a coastal range extending 800 kilometers from north of Colima, Colima to Tehuantepec, Oaxaca. Northeast of this coastal range lies the Balsas Depression, dominated by the Río Balsas, which collects the runoff of nearly all of the rivers east of the coastal range then cuts through the mountains to the Pacific Ocean along the northern boundary of Guerrero. The Transverse Volcanic Belt bounds our area of interest on the north and extends approximately 900 kilometers along the 19th Parallel from Tepic, Nayarit to Córdoba, Veracruz. Many of the great volcanoes of Mexico lie within this active belt.

Three major highways serve the states of Guerrero, Morelos, and México. Highway 95 is a modern paved highway, partially a turnpike, extending from Mexico City to Acapulco. The old highway requires more traveling time, but is kept in good condition to serve Taxco, Iguala, and Cacahuamilpa. A third highway passes from Cacahuamilpa to Toluca. Much of the area has no roads shown on any available maps. A seasonal coastal road extends in both directions from Acapulco and a network of secondary roads exists west of Cuernavaca and Iguala.

The larger cities in Guerrero are Chilpancingo (the capital), Acapulco, Taxco (often described as the most picturesque city in Mexico), and Iguala; Cuautla and Cuernavaca (the capital) are in Morelos.

GEOLOGY

Paleozoic noncaverniferous metamorphic rocks crop out throughout the southwestern half of Guerrero and cover nearly 50% of the states of Morelos and Guerrero. Farther north these metamorphics are the basement rocks for later deposits. Cenozoic extrusives and Tertiary pyroclastics and nonmarine conglomerate, limestone, and gypsum cover 35% more of the area. The thick, cave-forming Cretaceous limestones crop out in a rectangular area from Chilpancingo to south of Cuernavaca, totaling about 15% of the area of the two states (see map on page 114).

These Cretaceous limestones have been divided into several formations; only the two cavernous units will be described. Both are lower Cretaceous. The Morelos Formation comprises the major part of the limestone and dolomite strata of the western part of Morelos and the northern and central parts of Guerrero. It is probably the best cave-forming limestone in the area of interest, but not enough field work has been done to verify this. The strata are generally uniformly bedded with medium to thick beds. The limestone texture is variable, but contains no intercalated clay beds. White, cream, and gray are the most common colors of the limestone, and the dolomites are buff to brown or black. The thickness of the Morelos Formation is highly variable, ranging from a little less than 900 meters in central Morelos and 800 meters north of Acuitlapan, to 400-500 meters around Iguala. Several hundred meters of the Morelos Formation are also present around Chilpancingo.

The Cuautla Formation, which is separated from the underlying Morelos Formation, is commonly exposed between Cuernavaca and Cuautla where it reaches a thickness of 750 meters. The lithology is variable and is frequently difficult to distinguish from the Morelos Formation. It appears to represent a large marine bank oriented principally east-west. Upper Cretaceous rocks are not known to be cavernous.

Many periods of tectonic activity are recorded in the rocks of Guerrero. The first movements left their imprint on the Paleozoic metamorphics. Following the deposition of the Cretaceous sediments was a period of broad uplift and block-faulting. Next came a period of important folding and faulting attributed to the Laramide Revolution. North-south anticlinal mountain ranges and synclinal valleys dominate the tectonic topography of northeastern Guerrero. Most of the anticlines are of Cretaceous rocks, and the valleys are filled with post-Laramide Tertiary volcanics and non-marine sediments.

Few data have been gathered on speleogenesis in Guerrero and Morelos. Bretz (1955, p. 372, 373) describes his idea of cavern-making in the immediate area of Cacahuamilpa and lists a four-part physiographic history of the region which includes:

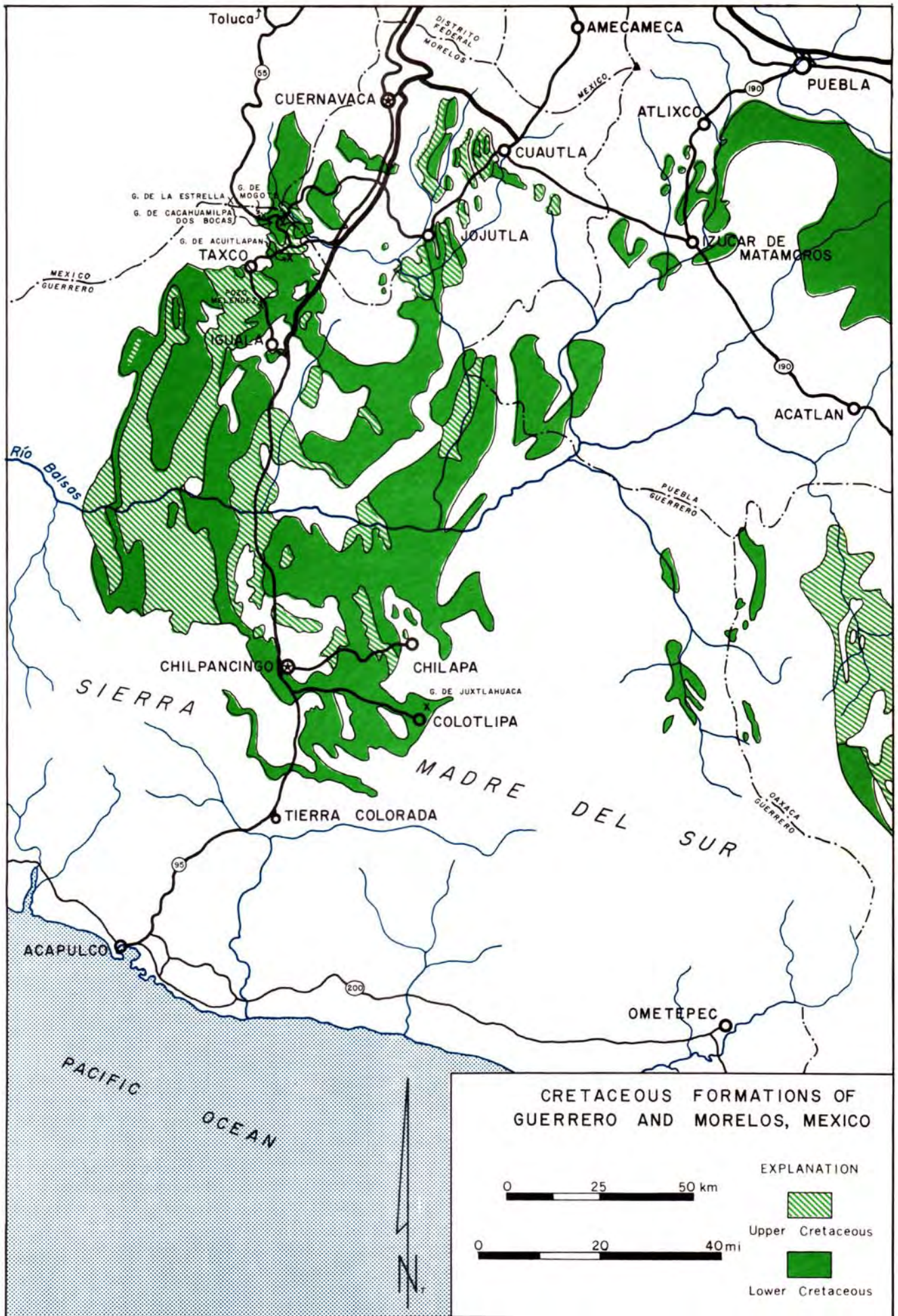
- 1) A tectonic topography produced by Laramide folding.
- 2) An erosional topography developed on mountain structures. The range of limestone hills is notched, perforated, and etched from the tectonic topography. The early, large phreatic caves were developed at this time.
- 3) Introduction of volcanic fills in the valleys.
- 4) Cessation of volcanism and inauguration of the present cycle of erosion, with stream valleys and barrancas eroded

in the volcanic detrital deposit. The subterranean stream piracy occurred late in the present erosion cycle.

Many caves are known to exist in other parts of Guerrero and Morelos, but no theory of speleogenesis is yet available.

BIBLIOGRAPHY AND SELECTED REFERENCES

- Bretz, J. Harlen (1955) Cavern-making in a part of the Mexican plateau. *Journal of Geology* 63(4): 364-375.
- Compañía Huelera Euzkadi, S.A. (1966) *Caminos de México*, 2nd ed. Mexico. 55 p.
- Fish, John and Reddell, James (1965) [Trip report] *AMCS Newsletter* 1(8): 73-77.
- _____ (1967) [Trip report] *AMCS Newsletter* 2(4): 82-87.
- Gay, Carlo E.T. (1967) Oldest paintings of the New World. *Natural History* 76(4): 28-35.
- International Geological Congress, 20th (1962) Excursión C-9. Volcanes, rocas volcánicas, sedimentos lacustres y aluviales del Pleistoceno y Plioceno; rocas clásticas y volcánicas terciarias; yeso y caliza no marinos del Terciario inferior; calizas y latitas del Cretácico Superior y calizas y dolomitas del Cretácico inferior, en el sur de la Cuenca de México y en el Edo. de Morelos. Mexico. 153 p. and 6 geol. maps.
- Millares, Jorge Hernández and Escribano, Alejandro Carrillo (1966) *Atlas Porrúa de la República Mexicana*. Editorial Porrúa, S.A.: Mexico. 128 p.
- Sánchez Mejorada, Santiago Hernández [compiler] (1956) Carta geológica de la República Mexicana. International Geological Congress, 20th.



Toluca

AMECAMECA

CUERNAVACA

ATLIXCO

PUEBLA

CUAUTLA

G. DE LA ESTRELLA
G. DE CACAHUAMILPA
DOS BOCAS

JOJUTLA

ZUCAR DE MATAMOROS

TAXCO

MEXICO GUERRERO

ACATLAN

Río Balsas

PUEBLA GUERRERO

CHILPANCINGO

CHILAPA

SIERRA

G. DE JUXTLAHUACA

COLOTLIPA

MADRE

DEL SUR

TIERRA COLORADA

ACAPULCO

OMETEPEC

PACIFIC OCEAN

CRETACEOUS FORMATIONS OF GUERRERO AND MORELOS, MEXICO

EXPLANATION

0 25 50 km



Upper Cretaceous

0 20 40 mi



Lower Cretaceous



CAVE DESCRIPTIONS

GRUTA DE ACUITLAPAN

Guerrero

Location: Near Acuitlapan which is between km posts 144 and 145 on the old highway east of Taxco. Inquire locally.

Description: Reported to be the largest cave known in Mexico. Local people say that the entrance is 5 meters high, 10 meters wide, and leads to a large cave. A river flows from the cave indicating exploration may only be possible during the dry season. It has not been explored by AMCS members.

References: Pemex Travel Club. Mexico's Caves and Caverns. 1964. p. 27.

Otis McAllister and Club de Exploraciones de México, both in Mexico City. 1966.

BOCA DEL BOCACITO

Guerrero

Location: Near Iguala, about 1/2 mile from Pozo Meléndez (Boca del Diablo). Well-known by local children. See location of Pozo Meléndez.

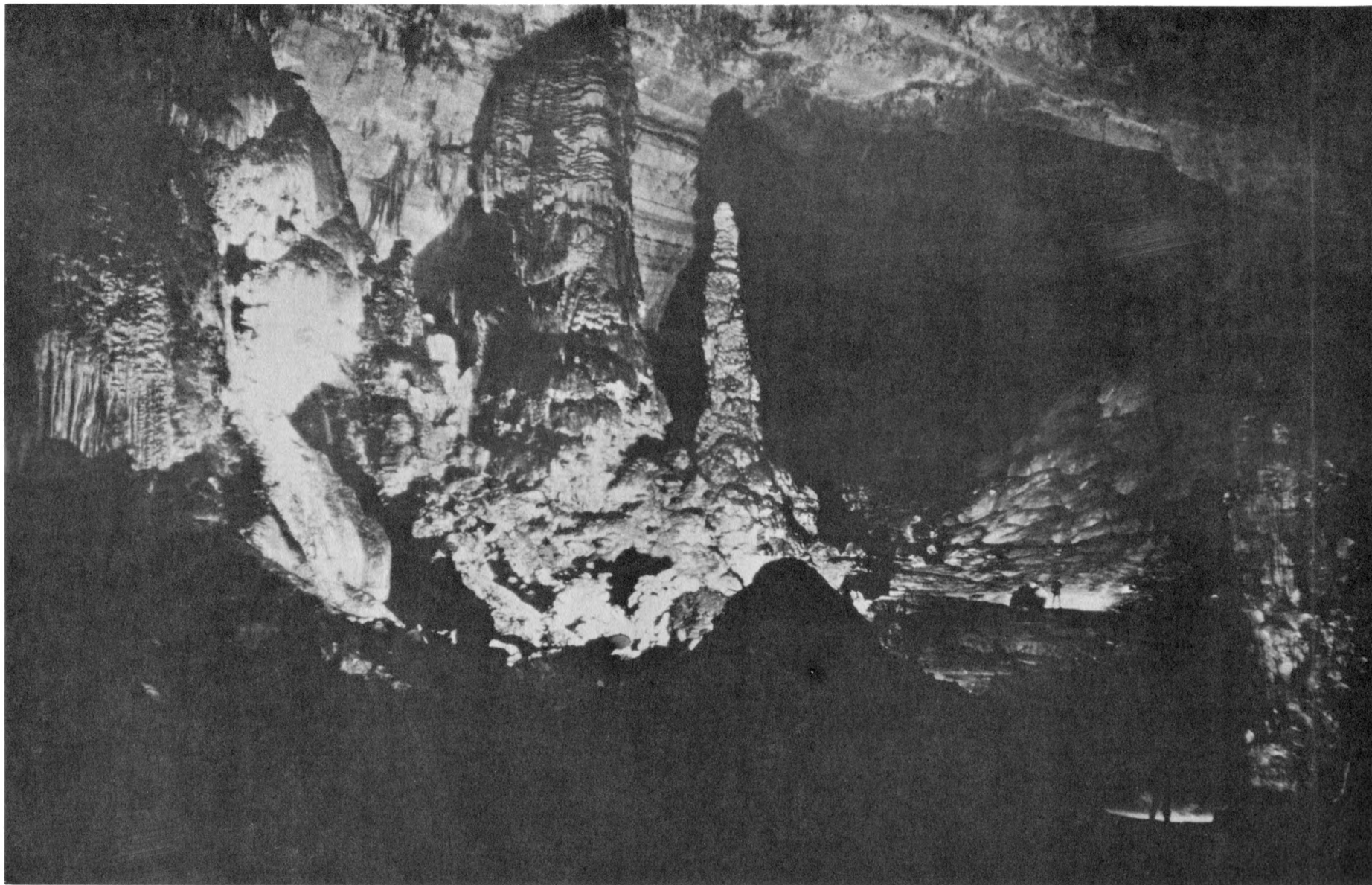
Description: A vertical shaft about 150 feet deep.

Reported by: Carroll Slemaker, 1956.

GRUTAS DE CACAHUAMILPA

Location: Take old road from Cuernavaca towards Taxco. At km. 138 turn right (north) to get to the cave which is 8 km. farther.

Description: This famous gruta is a large, electrically-lighted commercial cave which terminates in a room 1/2 mile long, 400 feet wide (maximum), and 275 feet high (maximum). Six miles of passage have reportedly been explored; however, this figure is very doubtful. Most maps show about one mile of passage, and no additional passage has been found by AMCS members. Commercial tours last up to four hours. The discovery of the caverns is credited to an Englishman who entered the cave with his dog this past century and failed to come out. Ing. Benítez, a priest at San Mateo Ixtla from 1789-1793 mentions a magnificent cavern in a manuscript he wrote during that period. The cave, being as large and spectacular as it is, naturally has many legends associated with it, and literally thousands of adventurous souls have visited the cave since its discovery. One source gives the earliest known visit to the cave as 1776.



GRUTAS DE CACAHUAMILPA. Passage at end of commercial trail, about 300 feet wide.
Photo by Terry Raines

CUEVA DE CARLOS PACHECO

Guerrero

Location: The cave is located less than a kilometer from Caca-huamilpa at about the same elevation and on the south slope of the canyon of the Río Amacuzac.

Description: The cave has a breakdown slope entrance in a large collapsed sink. Elongation of the cave is semi-parallel to the hillside. No evidence can be found to prove that a gravity-directed, free-surface stream ever used the cave (Bretz, 1959). The solutional features indicate a phreatic origin of the cave. Bretz suggests that the cave may have been a part of Cacahuamilpa at some time in the past. The cave is well decorated and has roughly 800 feet of passage. It has not been visited by AMCS members.

References: Mohr, Charles E. Special Supplement - Caves of Mexico. NSS News, April 1950.

Bretz, J. Harlen (1955) Cavern-making in a part of the Mexican plateau. Journal of Geology 63(4): 364-375.

cave

Guerrero

Location: Acahuizotla, Guerrero

Description: The cave is 40 yards long and contains bats.

Reported by: Dr. Dillard Carter, Texas A&M, Dept. of Wildlife Management. He visited the cave 5 Nov. 1959.

cave

Guerrero

Location: One mile south and 1/2 mile east of Almolonga.

Description: This cave has several crevices in an overhanging wall which contain bats. No passages exit at the bottom.

Reported by: Dr. Dillard Carter, Texas A&M, Dept. of Wildlife Management.

cave

Guerrero

Location: Near Mexcala which is 1.5 miles west from where Highway 95 crosses the Río Balsas. The cave is 6 to 8 km. downstream on the Río Balsas. It is 15 km. by road.

Description: No information is available on this cave other than it is supposed to contain bats.

Reported by: Dr. Dillard Carter, Texas A&M, Dept. of Wildlife Management.

cave

Morelos

Location: Three miles east of Tepoztlán, Morelos.

Description: The entrance is obscured by vegetation. The cave contains a room 30-40 yards long, 10 yards wide, and 3-4 yards high.

Reported by: Dr. Dilford Carter, Texas A&M, Dept. of Wildlife Management.

cave

Morelos

Location: One-half mile northwest of Huajintlán, Morelos

Description: The entrance is near the top of the northeast-facing wall of a "canyon", northwest of the village. The cave consists of one low-ceilinged room about 30 feet in diameter and contains numerous bats, chiefly Mormoops and Leptonycteris.

Reported by: W.B. Davis, Texas A&M, Dept. of Wildlife Management.

GRUTA DE CUALAC or COTOTOLAPAN

Guerrero

Location: Near the village of Cualac, in northern Guerrero, near the Puebla border. It is near the towns of Huaxuxtítlán and Chiepetlán.

Description: Chiefly of archaeological interest. A historical codex dating from the XVI century, but post-conquest, and executed on European paper was found here.

References: Pemex Travel Club. Mexico's Caves and Caverns. 1964. p. 17.

Muller, Florencia. "El Códice de Cualac".

GRUTAS DE CUETZALA

Guerrero

Location: Near Cuetzala which is 50 km. southwest of Iguala and can be reached by a road leading west of Iguala. Inquire locally.

Description: Another of the "largest-cave-in-Mexico" caves.

Reported by: Carroll Slemaker, 1956.

John Fish, personal communication with Otis McAllister, 1966.

CUEVA DEL DIABLO

Guerrero

Location: Near Mogote which is on the road between Cacahuamilpa and Toluca. The cave is in a large sink just north of the sink containing Grutas de Mogote. These sinks are about one km. east of Mogote.

Description: Not entered by AMCS members. Approaching the cave at dusk, James Reddell was told that the cave is very dangerous with many snakes and tigers, etc.

References: Fish, John and Reddell, James (1965) [Trip report] AMCS Newsletter 1(8): 73-77.

DOS BOCAS

Guerrero

Location: Near the Grutas de Cacahuamilpa; about 1/4 mile by trail below.

Description: Two, large separate caves with lower entrances about 300 feet apart are at the head of the canyon below Cacahuamilpa. Both caves are quite large, in some places well over 100 feet in diameter, and both have through-flowing rivers in them. Since they are actually two separate caves, they more properly would be called the Sumidero del Río Chontalcoatlán (lower boca) and Sumidero del Río San Jerónimo (upper boca).

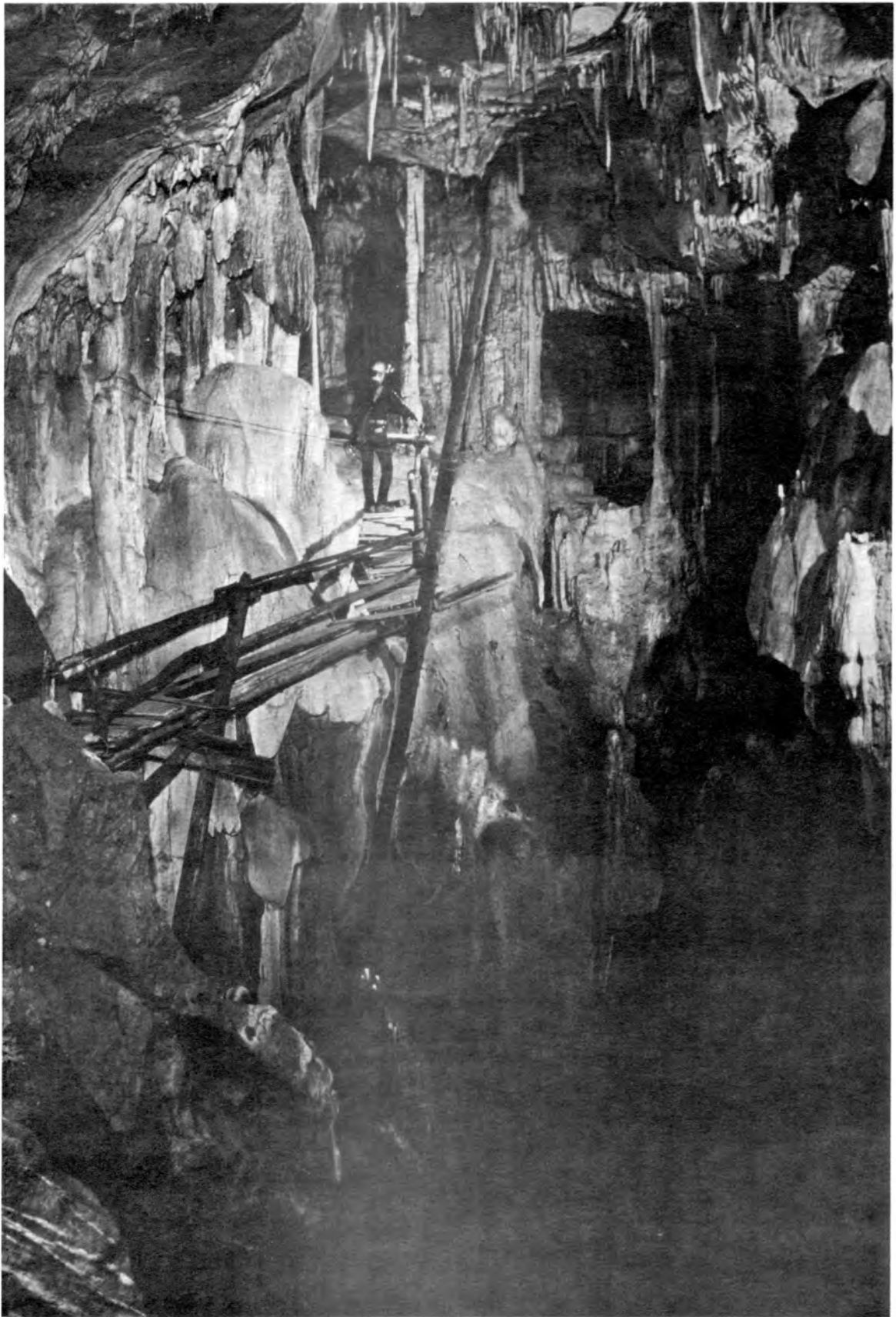
Bretz suggests that both caves represent separate phreatic systems which have pirated rivers and hence undergone extensive vadose enlargement. Boulders as large as 5 feet in diameter are sometimes carried by the flooding rivers. Together the two rivers drain about 2000 square kilometers of land. Topographic maps show that the overland distance from sink to boca for each river is 4 to 5 km. Downstream from the caves, the two rivers join to form the Río Amacusac. Collapse sinks (ponors) are reported to exist above each cave-river system. Exploration is possible only during the dry months from January through May. A Mexican exploring club has taken many trips through the caves, but no AMCS members have yet fully explored the Dos Bocas. The best time to explore the caves is in April or early May when the least rain occurs in the area.

GRUTAS DE LA ESTRELLA

México

Location: About ten miles west of Mogote on the highway from Cacahuamilpa to Toluca. Signs point the way.

Description: Grutas de la Estrella bears a close relationship to Cacahuamilpa and Dos Bocas. The cave has pirated a stream, a tributary to the Río Chontalcoatlán and contains extensive upper and lower



GRUTAS DE LA ESTRELLA. Bridge leads to upper level loop; pit below leads to main section of cave. Photo by Terry Raines

levels. The entrance passage is about 30 feet wide and 15 feet high and leads 150 feet to a waterfall that goes to the lower level; above it a bridge leads to the upper level. The upper level consists of a series of large rooms and passages with some formations, totaling about 1500 feet. The upper level is actually a closed loop and shows no signs of ever having had a stream. The 40 foot waterfall leads to a 60 foot-in-diameter lower level which has been explored for about 500 feet. It continues on as a large stream passage with several large columns and flowstone mounds.

References: Bretz, J. Harlen (1955) Cavern-making in a part of the Mexican plateau. *Journal of Geology* 63(4): 364-375.

Collier's Magazine. October 1, 1954.

GRUTAS DE JUXTLAHUACA

Guerrero

Location: Take the main road going east in Petaquillas, which is 3 miles south of Chilpancingo on the highway from Mexico City to Acapulco. The gravel road passes through the small towns of Mochitlán and Quechulté-nango on the way to Colotlipa, 25 miles from Petaquillas. In Colotlipa, Andrés Ortega is the government official in charge of the cave and will serve as a guide. The cave is an hour's walk (at a fast pace) northeast of Colotlipa.

Description: The name Juxtlahuaca, which means "beautiful, blue-green valley", is derived from a local hamlet. The main entrance is a few hundred feet above the valley floor and is about 15 feet wide and 15 feet high. Bats inhabit the first 1000 feet of the cave which consists mostly of walking passage, averaging 20 feet in diameter, and a few small places created by formation blocks. Also there is an upper level room where the bats stay. Beyond the bat cave section, the character of the cave changes to the most beautiful and well-decorated cave known in Mexico. There are numerous large rooms containing flowstone draperies and mounds, with running water and many types of speleothems. The cave also contains numerous human skeletal remains and pictographs (about 4000 feet from the entrance) attributed to the Olmec tradition. The pictographs are believed to have been painted between 800 and 400 BC. The skeletal remains could be more recent. About 4500 feet from the entrance is a large lake which has not been crossed by AMCS members. It is not known if more passage exists on the other side of the lake, but a map which appeared in *NATURAL HISTORY* indicates more passage. About 2500 feet from the entrance

there is a small side passage, mostly walking, which leads to a 12 foot deep sink 100 yards from the main entrance.

References: Pemex Travel Club. Mexico's Caves and Caverns. 1964.

Gay, Carlo E.T. (1967) Oldest paintings of the New World. Natural History 76(4): 28-35.

POZO MELENDEZ

Guerrero

Location: Between km. posts 180 and 181 on the highway between Iguala and Taxco. Near a school west of the highway take a dirt road south for a few hundred yards and turn right across a cobblestone bridge. The pit is at the far corner of the small field ahead.

Description: This is the legendary "Devil's Throat" into which many political prisoners were supposed to have been thrown. The entrance sink is about 30 feet in diameter. Near one side an opening 8 feet by 15 feet drops into a fissure 15 feet wide and 40 feet long with an unbroken drop of 220 feet. The fissure opens into the top of a large room 125 feet high, 60 feet wide, and 80 feet long. Short drops of 65 feet and 30 feet are necessary to descend to reach the main floor. A 5 foot wide well in the floor drops 10 feet to water in a small fissure passage 30 feet long.

CUEVACITA DE MOGOTE

Guerrero

Location: See location instructions for the Gruta de Mogote. The Cuevacita is in the same sink.

Description: A sloping room 60 feet by 40 feet by 20 feet.

Reference: Fish, John and Reddell, James (1965) [Trip report] AMCS Newsletter 1(8): 76.

GRUTAS DE MOGOTE

Guerrero

Location: One km. east of Mogote on the road from Cacahuamilpa to Toluca. A sink 400 feet in diameter and 100 feet deep with 50 foot cliffs in many places is located at the very edge of the road. The cave is in the bottom of the sink.

Description: At the bottom of the sink a hole drops 20 feet to a gravel floor. The hole is connected via a natural bridge to a second entrance. The second entrance is 50 feet away and 30 feet higher. A crawlway leads to the Salon de las Arenas where there is a sign indicating the name of the cave. A short crawlway leads into a large, formation-

decorated passage which extends perhaps 1/2 mile before turning into a water crawl. No equipment is necessary, although a depth of some 200 feet is reached via short, climbable drops. The cave has apparently been filled with gravel which was cemented and which is now in the process of being removed.

References: Fish, John and Reddell, James (1965) [Trip report]
AMCS Newsletter 1(8): 76.

CUEVA DE LA PENITA

Guerrero

Location: One mile south of Palo Blanco, Guerrero.

Description: Small sinkhole with a 12 foot entrance drop. Rope is needed. It has one main chamber and several smaller ones, and the cave contains bats.

Reported by: Dr. Dillard Carter, Texas A&M, Dept. of Wildlife Management.

BIOLOGY SECTION

THE MILLIPEDES IN THE CAVES OF MEXICO AND GUATEMALA

by NELL B. CAUSEY

Department of Zoology, Louisiana State University

The entrance of any cave is likely to have epigean millipedes that have either fallen in or wandered in in search of a moist substratum. The cave modified species, or troglobites, occur beyond the cave entrance, usually beyond the twilight zone and only in the zone of total darkness of damp caves, either smaller ones that are connected by passageways or large caves. They tend to congregate on damp soil and stones (including the ceiling) and on organic matter such as leaves, twigs brought in by rats, guano, paper, roots, and dead animal bodies.

Troglobites are distinguished from epigean species by the reduced pigmentation or complete absence of pigmentation, the reduced number of ocelli or complete absence of ocelli (some epigean millipedes have no ocelli), and the slight elongation of the legs and antennae. In length, Mexican troglobites range from about 90 mm down to 5 mm. As to shape, a few roll up into a minute pill that resembles a terrestrial isopod ("rolly-polly"), but the majority are the common millipede shapes, either cylindrical or with lateral keels on most body segments.

Some 19 species, one from Guatemala and the remainder from Mexico, representing five orders are suspected of being troglobites. In addition, I have specimens of at least 10 undescribed species and subspecies from Mexican caves. The orders that are represented are: Glomerida, 2 species; Polydesmida, the order most abundantly represented, with the families Rhachodesmidae and Stylodesmidae predominating; Chordeumida, represented by the families Cleidogonidae and Trichopetalidae; Cambalida, represented by the genera Cambala and Mexicambala; and Spirostreptida, represented by the genus Orthoporus in Yucatan. All of the troglobitic species, with the exception of the trichopetalid Mexiterpes sabinus, have close epigean relatives in Mexico.

The major collections have been made by the following people:

- 1) Dr. A. S. Pearse, who collected from the cenotes of Yucatan; his specimens were described by R. V. Chamberlin (1938), who found little evidence of cave modification in the some 20 representatives of four orders; I suspect that at least six species are troglobites.
- 2) Drs. F. Bonet, C. Bolívar, and their Mexican associates, who collected from caves in Veracruz, San Luis Potosí, Nuevo León, and Guerrero; their specimens, which were described by R. V. Chamberlin (1942), contain seven possible troglobites in two orders.
- 3) Members of the Texas Speleological Survey and Association for Mexican Cave Studies, represented chiefly by James Reddell, Terry Raines, Bill Russell, and John Fish, who investigated many new caves and went back to type localities for invaluable topotypes; I have been fortunate in having their specimens to study (Causey, 1963, 1964a, 1964b). In addition, there have been less extensive

collections by Stanley Kiem (Loomis, 1958), William W. Varnadoe, Jr. (Causey, 1960), and Raymond de Saussure.

References Cited

- Causey, Nell B. 1960. Millipeds collected in Guatemala caves, including Calymmodesmus inquinatus, n. sp. (Stylodesmidae: Polydesmida). Proc. Zool. Soc. Washington 73:275-280, figs. 1, 2.
- _____. 1963. Mexiterpes sabinus, new genus and new species, a Mexican troglobite (Diplopoda: Trichopetalidae). Psyche 70:235-239, 3 figs.
- _____. 1964a. New cavernicolous millipeds of the family Cambalidae (Cambalidea: Spirostreptida) from Texas and Mexico. Inter. Jour. Speol. 1:237-246, pls. 58, 59.
- _____. 1964b. Two new troglobitic millipeds of the genus Glomeroides from Mexico (Glomeridae: Glomerida). Proc. Louisiana Acad. Sci. 27:63-66, figs. 1-8.
- Chamberlin, R. V. 1938. Fauna of the Caves of Yucatan. XIV. Diplopoda from Yucatan. Carnegie Inst. of Washington, Pub. No. 491, pp. 165-182, figs. 1-55.
- _____. 1942. On centipeds and millipeds from Mexican caves. Bull. Univ. Utah, biol. ser., vol. 7, no. 2, pp. 1-19, figs. 1-22.
- Loomis, H. F. 1962. Two unusual Central American spirostreptid milliped species. Proc. Biol. Soc. Washington 75:47-52, figs. 1-8.

MEXICAN CAVE BIOLOGY: ANNOTATED BIBLIOGRAPHY

by JAMES REDDELL

1. Álvarez, Ticul. 1963. "The recent mammals of Tamaulipas, Mexico." Univ. Kansas Mus. Nat. Hist. Publ., 14(15): 363-473.

In addition to general observations on biotic provinces, dispersal routes, etc., this report includes an annotated list of the mammals of Tamaulipas. The following species of bats are recorded from caves: Pteronotus rubiginosus mexicanus (Miller), Choeronycteris mexicana Tschudi, Mormoops m. megalophylla (Peters), Glossophaga soricina leachii (Gray), Leptonycteris n. nivalis (Saussure), Artibeus j. jamaicensis Leach, Artibeus lituratus palmarum J.A. Allen and Chapman, Artibeus aztecus Anderson, Desmodus rotundus murinus Wagner, Diphylla ecaudata Spix, Natalus stramineus saturatus Dalquest and Hall, Myotis nigricans dalquesti Hall and Alvarez, Tadarida brasiliensis mexicana (Saussure), Tadarida aurispinosa (Peale), and Tadarida laticaudata ferruginea (Goodwin). Brief descriptions of several of the caves are also included.

2. Álvarez, Ticul, and Clemencia E. Aviña. 1964. "Nuevos registros en México de la familia Molossidae." *Rev. Soc. Mex. Hist. Nat.*, 25:243-254.

Included with this collection of new records for molossid bats in Mexico is an account of three additional specimens of Tadarida aurispinosa Peale from Cueva del Abra, Tamps.

3. Axtell, Ralph W. 1962. "An easternmost record for the bat Choeronycteris mexicana from Coahuila, Mexico." *Southwestern Nat.*, 7(1):76.

This records the presence of the hog-nosed bat, Choeronycteris mexicana, in a cave northeast of Hermanas, Coahuila. (note: this cave is probably Cueva de la Herradura).

4. Baker, Rollin H. 1951. "Mammals from Tamaulipas, Mexico." *Univ. Kansas Mus. Nat. Hist. Publ.*, 5(12):207-218.

Desmodus rotundus murinus, the vampire bat, is recorded from two caves in Tamaulipas: Cueva de Los Troncones, 12 km. west and 8 km. north of Victoria; and a cave south of Victoria.

5. Baker, Rollin H. 1956. "Mammals of Coahuila, Mexico." *Univ. Kansas Mus. Nat. Hist. Publ.*, 9(7):125-335.

This volume includes an annotated list of all mammals recorded from the state of Coahuila. Also included are discussions of the relationships of mammals to different plants and life zones. The following bats are reported from caves: Aello (Mormoops) megalophylla senicula (Rehn), Choeronycteris mexicana Tschudi, Myotis velifer incautus (J.A. Allen), Eptesicus fuscus pallidus Young, Corynorhinus townsendii australis Handley, and Tadarida brasiliensis mexicana (Saussure). Several caves are briefly described.

6. Baker, Rollin H. 1960. "Mammals of the Guadiana Lava Field, Durango, Mexico." *Mus. Michigan State Univ. Biol. Series Publ.*, 1(9):305-327.

The bats, Myotis thysanodes thysanodes Miller, Choeronycteris mexicana Tschudi, and Myotis velifer velifer (J.A. Allen), were taken from small openings and fissures in lava hillocks at and near La Pila, Durango.

7. Baker, Rollin H., and J. Keever Greer. 1960. "Notes on Oaxacan mammals." *J. Mammal.*, 41(3):413-415.

The bats, Balantiopteryx io Thomas and Desmodus rotundus murinus Wagner, are reported from a cave 1 1/2 mile south of Tolloso, Oaxaca. B. io had not previously been reported from Oaxaca.

8. Baker, Rollin H., and J. Keever Greer. 1962. "Mammals of the Mexican state of Durango." *Michigan State Univ. Biol. Series Publ.*, 2(2):29-154.

This annotated check-list of the mammals of Durango includes records of the following species of bats from

caves or cave-like situations: Myotis t. thysanodes from "cavelike fissures in a low hill of volcanic rock" near La Pila; Myotis v. velifer from a "large, but shallow cave" on the Rancho Las Margaritas, south and west of Vicente, Guerrero; Plecotus townsendii australis from a limestone cave north of Campana, known locally as Cueva de los Indios; and Antrozus pallidus pallidus from Cueva de los Indios and other caves.

9. Carter, Dilford C., Ronald H. Pine, and William B. Davis. 1966. "Notes on Middle American bats." *Southwestern Nat.*, 11(4): 488-499.

This report includes a record of Myotis thysanodes aztecus Miller and Allen from the entrance of a limestone cave 7 mi southeast of San Cristóbal de las Casas, Chiapas. It is a first record for this species in Chiapas.

10. Cockrum, E. Lendell. 1960. "Distribution, habitat and habits of the mastiff bat, Eumops perotis, in North America." *J. Arizona Acad. Sci.*, 1(3):79-84.

This study of the mastiff bat includes a record of a skull of Eumops perotis in "Indian Cave", near Cuatro Ciénegas, Coahuila, Mexico.

11. Cockrum, E. Lendell, and Gordon van R. Bradshaw. 1963. "Notes on mammals from Sonora, Mexico." *Amer. Mus. Nov.*, 2138. 9pp.

This account of mammals in the state of Sonora includes records of the following bats in Cueva del Tigre, 14.9 mi. SSE Carbo: Chilonycteris parnelli mexicana, Pteronotus davyi fulvus, Mormoops m. megalophylla, Leptonycteris nivalis sanborni, Natalus stramineus mexicanus, and Tadarida brasiliensis mexicana.

12. Constantine, Denny G. 1958. "An automatic bat-collecting device." *J. Wildlife Management*, 22(1):17-22.

This account of a new bat-collecting device includes reference to the capture of eight species of bat in a cave near Valles, San Luis Potosí.

13. Davis, Wayne H. 1959. "Taxonomy of the eastern pipistrel." *J. Mammal.*, 40(4):521-531.

This taxonomic revision of the bat species, Pipistrellus subflavus, includes P. subflavus veraecrucis (Ward) from a "cave 'Close by the hamlet of Las Vigas,' Canton of Jalapa, Veracruz, Mexico."

14. de la Torre, Luis. 1955. "Bats from Guerrero, Jalisco and Oaxaca, Mexico." *Fieldiana: Zool.*, 37:695-701, pl. 30-31.

This report on Mexican bats includes records of Balantiopteryx p. plicata Peters, Chilonycteris rubiginosa mexicana Miller, Chilonycteris psilotis Dobson, Pteronotus davyi fulvus Thomas, Mormoops m. megalophylla Peters, Glossophaga soricina leachi Gary, and Desmodus rotundus murinus Wagner from a cave 5 miles northwest of Acapulco,

Guerrero; of Balantiopteryx p. plicata Peters from a cave at Tehuantepec, Oaxaca; and of Balantiopteryx p. plicata Peters and Leptonycteris nivalis nivalis Saussure from a cave 12 miles south of Mexcala, Guerrero.

15. Ingles, Lloyd G. 1958. "Notas acerca de los mamíferos Mexicanos." Anal. Inst. Biol., 29(1-2):379-408.

This report on Mexican mammals includes records of Balantiopteryx plicata in caves at Manzanillo, Colima, and near San Blas, Nayarit; of Glossophaga soricina in a cave near San Blas, Nayarit; of Artibeus jamaicensis in a cave near Chochola, Yucatan; and of Desmodus rotundus in a cenote at Chichén-Itzá, Yucatan, and in a cave 7.5 km. SE Mitla, Oaxaca. Other bat records include specimens taken in abandoned mines.

16. Long, Charles A., and Carolyn J. Jones. 1966. "Variation and frequency of occurrence of the baculum in a population of Mexican free-tailed bats." Southwestern Nat., 11(2):290-295.

The baculum is studied in bats, Tadarida brasiliensis mexicana, taken from a cave at Cofre de Perote, 9200 feet elevation, Veracruz.

17. Ward, Henry L. 1891. "Descriptions of three new species of Mexican bats." Amer. Nat., 25:743-753.

A new species of bat, Vesperugo veraecrucis (= Pipistrellus subflavus veraecrucis), is described from a cave near Las Vegas, Jalapa, Veracruz. In addition Vespertilio (= Myotis) velifer and Plecotus macrotis (= mexicanus) are reported from this cave, which is briefly described.

THE ASSOCIATION FOR MEXICAN CAVE STUDIES

NEWSLETTER

TRIP REPORTS

Sótano de la Joya de Salas, Tamps.

Sótano de San Francisco, S.L.P.

Sierra de El Abra and Xilitla, S.L.P.

Cañón de la Huasteca, N.L.

Sótano de Tlamaya and Xilitla Region, S.L.P.

Tamuín and Xilitla, S.L.P.

Xilitla, S.L.P. Region

Notes on the Exploration of Sótano de La Silleta

Cacahuamilpa, Gro. area and Huautla, Oax. area

Aquismón, S.L.P. area

1966 AMCS MEMBERSHIP LIST

NOTES FOR PHOTOGRAPHERS IN MEXICO

CAVE DISTRIBUTION IN MEXICO

BIOLOGY SECTION

Mexican Cave Beetles of the Family Carabidae

VOLUME II INDEX

THE ASSOCIATION FOR MEXICAN CAVE STUDIES

NEWSLETTER

Volume II Number 6

November - December 1966

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The AMCS NEWSLETTER is published six times a year by the Association for Mexican Cave Studies, P.O. Box 7672, University Station, Austin, Texas, 78712, USA. The Association for Mexican Cave Studies is a nonprofit organization whose goals are the collection and dissemination of information concerning Mexican caves. Membership is open to all interested persons at a rate of \$5.00 US currency for the calendar year, with memberships starting at the first of each year. Persons joining after the first of the year will receive all publications for that year. Publications for the year of 1965 are still available for \$6.00 US by writing to the AMCS.

Members are urged to submit articles for publication. The article may cover any phase of Mexican speleology. Trip reports are requested from all trips.

Editor..... Terry W. Raines
Assistant Editor..... John Fish
Treasurer..... Philip Winsborough
Cave Files..... T. R. Evans
Cartographer..... Don Erickson

NEWS NOTES

- During the past Christmas vacation (December, 1967) the Western Hemisphere depth record was surpassed twice in the Huautla, Oaxaca area. A group composed of Bill Biggers, T. R. Evans, Cliff Foreman, and John Fish was able to penetrate Sótano de San Agustín to a depth of about 1625 feet. Very high water and a need for more specialized equipment prevented further exploration. Two days later, after several days of exploring and mapping in the upper levels, Titch Morris, Pete Thompson, Keith Kennedy, Ian Drummond, Alan Ball, and Mike Boon from McMaster University, Ontario, Canada, entered Sótano del Río Iglesia (1/4 mile from Sótano de San Agustín) for a projected 4 1/2 day push. They surveyed about 7000 feet of passage and reached a new record depth of 1755 feet, which is apparently the end of the cave.
- This number of the Newsletter completes Volume II. Persons planning to have their volume bound can do so at this time. Included with this issue are brown, heavy-paper covers for the first three numbers which may be used as dividers in binding.
- The next issue of the Newsletter will initiate the 1967 year of AMCS publications. Previous members are urged to rejoin now and also to actively recruit persons with a sincere interest in Mexican speleology. As the membership grows, the quality of AMCS publications as well as the amount of photographic coverage and multicolor reproductions can be increased.

TABLE OF CONTENTS

NEWS NOTES	130
TRIP REPORTS	
Sótano de la Joya de Salas, Tamps.	132
Sótano de San Francisco, S.L.P.	137
Sierra de El Abra and Xilitla, S.L.P.	139
Cañón de la Huasteca, N.L.	140
Sótano de Tlamaya and Xilitla Region, S.L.P.	146
Tamuín and Xilitla, S.L.P.	148
Xilitla, S.L.P. Region	149
Notes on the Exploration of Sótano de La Silleta	155
Cacahuamilpa, Gro. area and Huautla, Oax. area	156
Aquismón, S.L.P. area	163
1966 AMCS MEMBERSHIP LIST	167
NOTES FOR PHOTOGRAPHERS IN MEXICO by J. H. Schermerhorn . . .	171
RECENT ADDITIONS TO THE KNOWLEDGE OF CAVE DISTRIBUTION IN MEXICO by William H. Russell and Terry W. Raines . . .	173
BIOLOGY SECTION	
MEXICAN CAVE BEETLES OF THE FAMILY CARABIDAE by Thomas C. Barr, Jr.	182
INDEX, VOLUME II, 1966	186
ILLUSTRATIONS	
Sótano de Santa María	133
Sótano de la Joya de Salas	135
Photographs of Sótano de la Joya de Salas	136
Sótano de San Francisco	138
Sketch Map of Cañón de la Huasteca, N.L.	141
Photograph of Cañón de la Huasteca, N.L.	142
Grutas de San Bartolo (north cave)	144
Cueva de La Boca	145
Xilitla area	152
Gruta de Navidad	153
Cueva de San Agustín; Grutas de la Estrella	158
Sótano del Camino	160
Sótano de San Agustín	162
Sierra Madre Oriental, Northeastern Mexico (cross section) . .	180

TRIP REPORTS

- Persons: Ed Alexander, Don Erickson, Orion Knox, Bob Reed,
Jeannie Wiggins
- Date: 23-28 November 1966
- Destination: Joya de Salas, Tamaulipas
- Reported by: Ed Alexander Austin, Texas

Our trip south from Austin was planned with the purpose of again reaching the known bottom of Sótano de la Joya de Salas where several small leads had remained unchecked by the previous group (see AMCS Newsletter, v. I, no. 6, p. 54, 56). We arrived at Encino on Highway 85 south of Cd. Victoria, Tamps. after an all night drive. Here the road to Joya heads west toward the high mountains, only a few miles away, which we could see rising several thousand feet above us in the early morning haze. Making the Land Rover as comfortable as possible for five people on the rough roads to follow, we left the pavement and started up, road logging as we went. The Río Sabinas was crossed 3 miles from the town. Here the old lumber road turned sharply left and we saw the first of 55 miles and 3 days of steep, 4-wheel drive, bone-breaking driving. All the roads which we found on the mountain were still in miserable condition due to an 8 day hurricane which swept this area of Mexico a couple of months earlier. In many places large trees had only recently been cleared from the roadway.

Only 3 miles up the switchbacks we noticed that many large sinks were developed along our route. From here on up almost all of the large annual rainfall drains internally. At 6.2 miles from Encino the first of many pits was found which opened immediately to the side of the road. This one was on the right shoulder and appeared to be about 30 feet deep. A mile and a half further along we came to Sótano de Santa María which had been reported earlier by McKenzie (see AMCS Newsletter, v. I, no. 3, p. 24-25). The 20 foot in diameter shaft opened only 15 feet to the left of the road, so tying off to the trailer hitch I rappelled in. The shaft dropped about 100 feet to the top of a breakdown slope which descended about 50 feet more to the floor of the cave. (See sketch map on page 133.) The lower third of the cave was decorated with light-colored flowstone and several formations. Several small pools were near the far edge of the room. No leads could be found.

The road continued on toward the Julilo lumber camp, still 3.5 miles away. While yet 1.5 miles from the camp we again stopped to look at one of the many very promising sinks, this one just to the right of the road. A small horizontal cave was found in this particular one. It sloped in over small breakdown for less than 100 feet. Don returned to the car, reporting that several bones were present in the cave. Soon we arrived in Julilo where we stopped for lunch while inquiring about roads and caves in the area. At the store we learned that the road forks here, Joya de Salas to the right and La Perra and Rancho del Cielo to the left. Here we were also told of a cave about one mile on toward Joya which was described as having a "cathedral" room inside. Although we failed to locate the cave, it is probably a fairly large, decorated room. There is also a cave near La Mina. This may be the same as the "cathedral".

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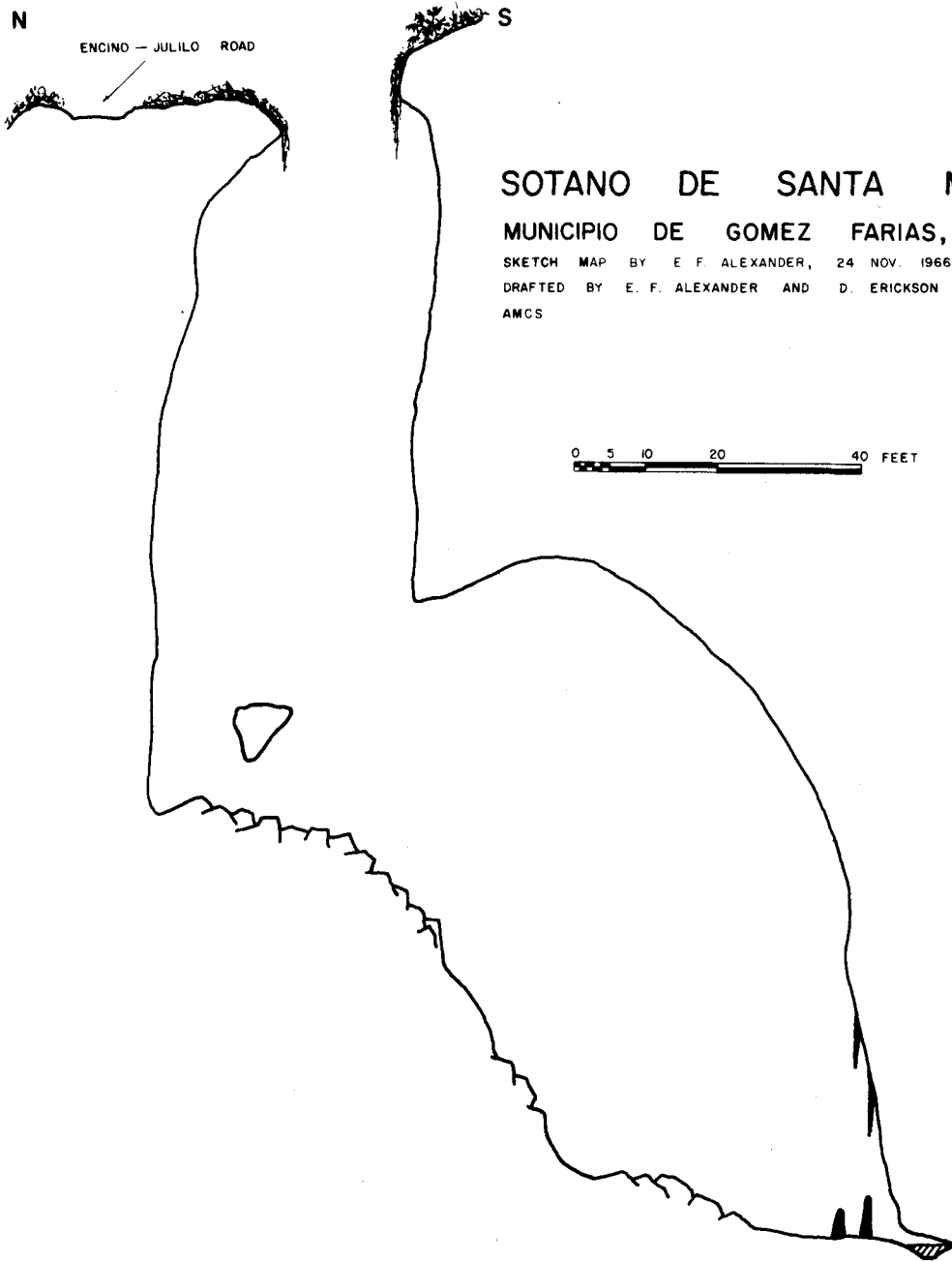
ENCINO — JULILO ROAD

S

SOTANO DE SANTA MARIA
MUNICIPIO DE GOMEZ FARIAS, TAMAULIPAS

SKETCH MAP BY E. F. ALEXANDER, 24 NOV. 1966
DRAFTED BY E. F. ALEXANDER AND D. ERICKSON
AMCS

0 5 10 20 40 FEET



As we drove on, the road became steeper and the sinks became larger. After a couple of miles we found ourselves winding between large dolinas which were up to a quarter of a mile across. Filled sinks and small open pits were still too numerous to count. Several times we stopped and found that the dense vegetation was supported by small karst pinnacles separated by narrow fissures. Rocks dropped down these fissures would sometimes rattle for several seconds. About four miles out of Julilo we crossed over the top of the range and continued west through the now dryer forest. Sinks were still very numerous. One pit was too close to the road to be passed by, so stopping for a few minutes Don dropped down to check it. Fifty feet down it quit. From this pit the road gradually descends for about four miles into the valley of Joya de Salas. We found Sótano de la Joya de Salas just beyond the school on the far side of the village, 22 miles from the Inter-American Highway.

The town, consisting of about 40 families, and the sótano are located in a wide, flat, grassy valley entirely surrounded by low mountains. (See photograph on page 136.) At the southern end is a low divide, about 100 feet high, which separates this valley from another which is also a flat grassland, except studded with groves of pines. Near the town in the center of the valley is a wide, shallow lake of several acres. The sótano is several hundred yards away, and just above it is an earthen dam which impounds a smaller lake, thus preventing runoff from entering the cave. At the school house we found the 'professor' and told him our plans to re-enter the sótano. From him we learned that during the hurricane of 1909 a log jam plugged the entrance and the entire valley filled with water until it flowed over the divide at the southern end. The town was completely flooded. When the jam broke there was a huge explosion and a giant whirlpool drained the entire flood into the pit. Then, during the recent hurricane earlier this fall, the upper lake overflowed and there was again a whirlpool over the entrance. This was the first time the cave had flooded since 1955.

Although it was now late in the afternoon, we decided to rig the entrance in order to get an early start in the morning. We found the expansion bolt which had been used at the entrance by the previous group, ascertained that it was still solid, and dropped a rope down the 258 foot chasm. Orion rappelled in to check the bottom and found that the recent flood had caused no noticeable change.

The next morning our entire group entered the cave and proceeded directly to the Cathedral Room where we stopped to eat lunch. (See AMCS Newsletter, v. I, no. 5, p. 54-58 for a description of the cave. Also, see cave map on page 135 of this issue.) Here at the 650 foot level Bob drew the job of checking a couple of unpleasant mud crawlways which didn't go. The cave was still quite wet and the flood had left many interesting marks. There were the usual logs jammed high above our heads, but most striking were the Tecate cerveza cans (empty) which stood upright on the ledges at this level, as if they had just been left the night before. From here Orion, Don, and I continued on to the end of the previous exploration and the supposed bottom of the cave at 892 feet. At least we found that it wasn't under water. Where did all the water go?

Small passages led from each end of the bottom. One which

FEET
0
100
200
300
400
500
600
700
800
900

SOTANO DE LA JOYA
JOYA DE SALAS, TAMAULIPAS, MEXICO
BRUNTON AND TAPE SURVEY BY
J. FISH, O. KNOX, D. MC KENZIE
ASSOCIATION FOR MEXICAN CAVE STUDIES
UNIVERSITY OF TEXAS GROTTO, N.S.S.
DRAFTED BY O. KNOX, 8 JUNE 1965

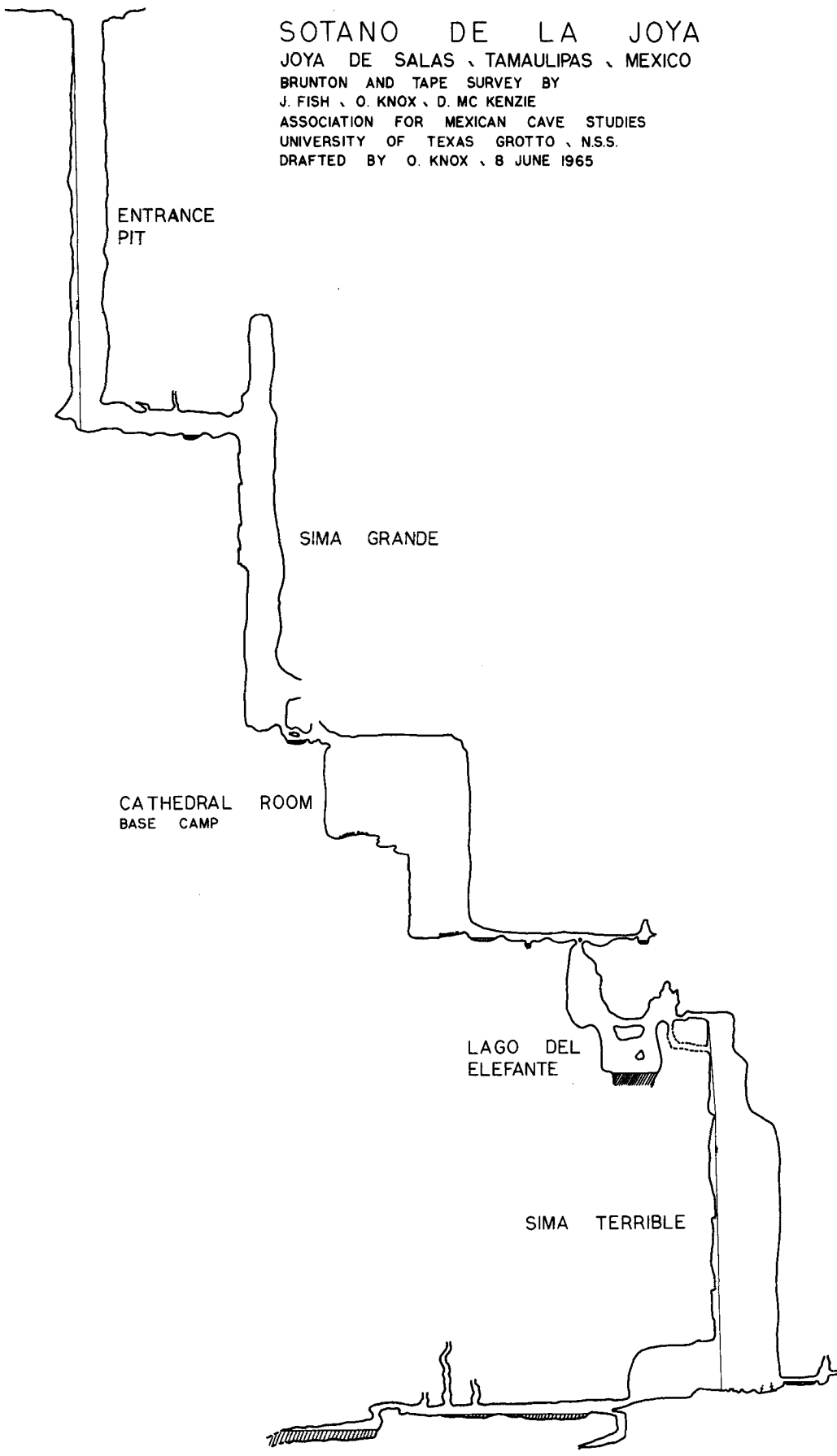
ENTRANCE
PIT

SIMA GRANDE

CATHEDRAL ROOM
BASE CAMP

LAGO DEL
ELEFANTE

SIMA TERRIBLE





View of entrance to Sótano de la Joya de Salas. After heavy rains the lake (left center) overflows into the sótano.
Photos by Orion Knox



Passage leading from entrance drop.
Note logs wedged in passage.



Sima Terrible, total drop 230 feet.

had not been checked was followed for several hundred feet, but it became a tighter and tighter crawl until it was finally blocked by a formation. In the other direction we continued past the lowest surveyed point, splashing through soupy mud in what looked like an upstream passage until we reached a flowstone block at the 'end'. Checking closer we found a waterline mark which was level with a small opening near the top of the flowstone. Debris clinging to the rocks showed that we were indeed in a downstream passage that had carried quite a bit of water. Climbing over the block we found a 5 foot drop on the far side into a pool of water. Orion dropped down into the water and found it to be about 3 feet deep. The walls and bottom were solid, smooth rock and what had at first appeared to be a round room was actually a low passage. However, after about 25 feet the ceiling dipped to the water level and the passage siphoned. This was indeed the route by which the large volumes of water continued on through the cave. Here we turned back, somewhat frustrated but at least happy to know that Sótano de la Joya de Salas still has a chance to drop through more of its several thousand foot potential. Perhaps after a long, dry period, or if the water level can be artificially lowered, it may be possible to explore more of the cave.

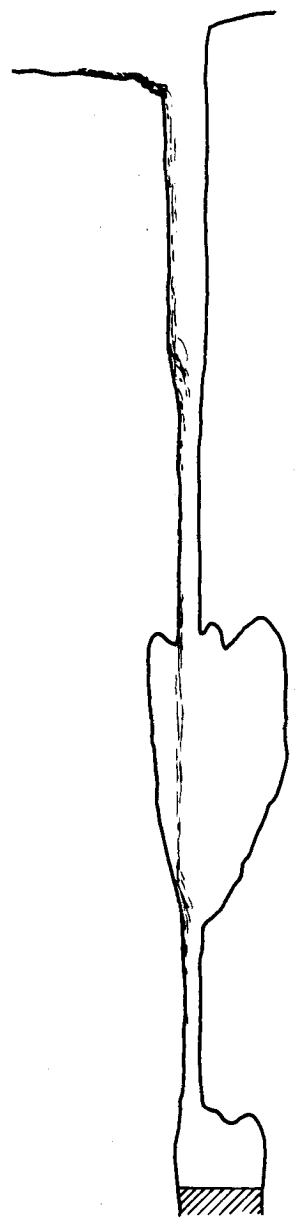
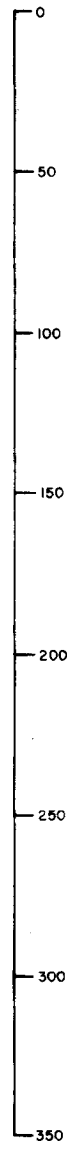
We emerged from the cave and pulled the last rope out behind us shortly after midnight. The next morning we spent some time in the southern valley, casually looking at a few of the many short, blind pits that dot the grassy floor. Leaving the valley we drove back down to Julilo carrying a hitchhiker with us who told of a nearby cave which holds the remains of a number of solders from the Mexican revolution. This cave may be large and is somewhere just east of Joya de Salas. At Julilo we turned right and drove about 4 miles through an extremely dense, karst-floored jungle to Rancho del Cielo. We spent the night there and continued on out t the next day to Gómez Farías and Highway 85.

-
- Persons: Jonathan Davis, John Fish, Charles Jennings, Charlie Loving, Susie Loving, Mac McLaughlin
 - Date: 23-27 November 1966
 - Destination: Matehuala, S.L.P.; Sótano de San Francisco, S.L.P.; Xilitla, S.L.P.
 - Reported by: John Fish Austin, Texas

Our primary destination for this trip was the Sótano de San Francisco, in Valle de los Fantasma, which was reported in AMCS Newsletter, v. II, no. 4, p. 82. We left Austin Wednesday afternoon and with few delays arrived in Matehuala, S.L.P. (south of Saltillo, Coah.) on Thursday morning, 24 November. Here we drove east of town about one mile on the road to Doctor Arroyo, then walked south to the gypsum sinks, which are also mentioned in the previous report. We explored and mapped Sumidero de Matehuala Núm. 3, which is a shallow sink 240 feet in diameter with an arroyo leading to a cave. A drop of about 8 feet leads to the first room, which has several skylights. Another short drop leads to a 26 foot drop into a mud room. Two small crawlways ended quickly in siphons.

Thursday afternoon we drove on to San Luis Potosí, then turned east on the road to Cd. Valles, S.L.P. At Valle de los Fantasma,

DEPTH IN FEET



SÓTANO de SAN FRANCISCO
MUNICIPIO de SAN FRANCISCO, S. L. P.

SKETCH MAP BY J. FISH, NOV. 1966
DRAFTED BY J. FISH AND D. ERICKSON
A. M. C. S.

a high mountain karst area with abundant sinks and karst pinnacles, we stopped for the night. The next morning we tied off a 500 foot rope at Sótano de San Francisco and I rappelled in. The entrance is about 10 by 15 feet, but 100 feet down the pit narrows to a cylinder about 5 feet in diameter which remains this size most of the way to the bottom. (See sketch map on page 138.) A small stream poured over the lip and disappeared down the narrow pipe. The topside people were eagerly waiting for me to get off the rope, but 340 feet down I encountered a "bottomless" lake in a room 30 feet long and 8 feet wide. Since there was not even a place to get off I began the prusik out. The 340 foot depth is a rope measurement and is probably only within ± 10 feet, since I could not get off the rope. We left San Francisco and began hopping from pit to pit, looking for one that led to a large cave. Biological collections were made from several of the pits, including Mexisphodrus beetles and several blind beetles. Everyone got into the act. The pits are so numerous that they would be impossible to locate except by a very accurate map of the valley. Depths ranged from as little as 60 feet to 288 feet for Sótano de Carlos, which is reached by walking north of San Francisco through a pass. Evidently there is more of the same type of karst farther north, but as yet unchecked. Sótano de Carlos has a small entrance under a boulder, which bells out to a free drop in a room 25 by 75 feet and 288 feet deep. Charles Jennings, Jonathan Davis, and Mac McLaughlin entered the pit and reported beautiful flowstone-covered walls and 3 foot soda straws at the bottom. Late in the afternoon we drove on toward Cd. Valles, camping just east of Río Verde.

Saturday, we drove on to Xilitla and to the Tlamaya valley. We looked at the entrances to Sótano de Huitzmolotitla and Sótano de Tlamaya, then walked around the Tlamaya valley searching for new caves and pits. Two small pits just below Sótano de Ortega, low on the southern side of the valley, were checked. One pit was 30 feet deep, which J. Davis reported to be connected by a small hole to another pit. C. Jennings went down the other pit which was very narrow at the top but about 10 by 25 feet at the bottom and 80 feet deep. Saturday night we spent talking with the owner and ranch hands at Rancho de Huitzmolotitla. Sunday we returned to Austin.

-
- Persons: Reva Byers, Jim and Gina Duke, Joe and Janet Repa,
Richard Smith
 - Date: 23-27 November 1966
 - Destination: Sierra de El Abra and Xilitla, S.L.P.
 - Reported by: Jim Duke Austin, Texas

We left Austin on 23 November and visited Grutas de Quintero and Cueva de El Abra, both in Tamaulipas, on 24 November. On 25 November we attempted to enter Sótano del Tigre near Cd. Valles, S.L.P. but got lost trying to find the cave and ended up at Sótano del Arroyo. By the time we arrived at Tigre it was too late to accomplish anything. In our wanderings we did find one very small pit of about 70 feet near Sótano del Arroyo which was not entered. It is probably a part of the Arroyo system since it is only a hundred or so yards from the first drop into the cave.

On 26 November we drove to Xilitla, S.L.P. and on west, past Ahuacatlán, to the area of Sótano del Pozo and Sótano de las Hoyas. We climbed the opposite slope from the two pits and, with the help of the land owner, found a small pit, Sótano del Meloscho. The pit was about 170 to 180 feet deep at the most. At the bottom we found some skull bones which were identified by University of Texas anthropologists as recent. We left the cave and started back, spending the night at El Nacimiento del Río Mante near Cd. Mante, Tamps. and then drove to Austin, Texas.

- Persons: Jerry Broadus, Joseph Cepeda, Terry Raines, Bob Richardson, Cindy Tracy
 Date: 2-4 December 1966
 Destination: Cañón de la Huasteca and Cueva de La Boca, N.L.
 Reported by: Terry Raines Austin, Texas

For some obscure reason the Mexican customs officials decided that today they were not accepting Selective Service Registration Certificates as proof of U.S. citizenship. All of us had birth certificates except Jerry. I argued with the officials, maintaining that we had crossed the border many times using only a registration card, but all was to no avail. They informed us that Jerry would have to get a notarized affidavit declaring his citizenship before a visa could be issued. Jerry went back to the U.S. side, paid \$2.00 for a notary, and returned with the affidavit. We encountered no further difficulties. The night was spent camped beside the road just north of Sabinas Hidalgo.

3 December Our trip had several objectives: learn what kind of plant was being built on the road to Villa de García as information for AMCS Bulletin No. 1; visit caves in Cañón de la Huasteca; explore Cueva de La Boca; and map the caves at El Diente, a prominent mountain containing several caves and deep mines.

Driving through Monterrey, we turned west toward Saltillo and after a few miles turned north on the Villa de García road. The plant, six miles down the road, was Industria del Alkali, S.A., a producer of alkali.

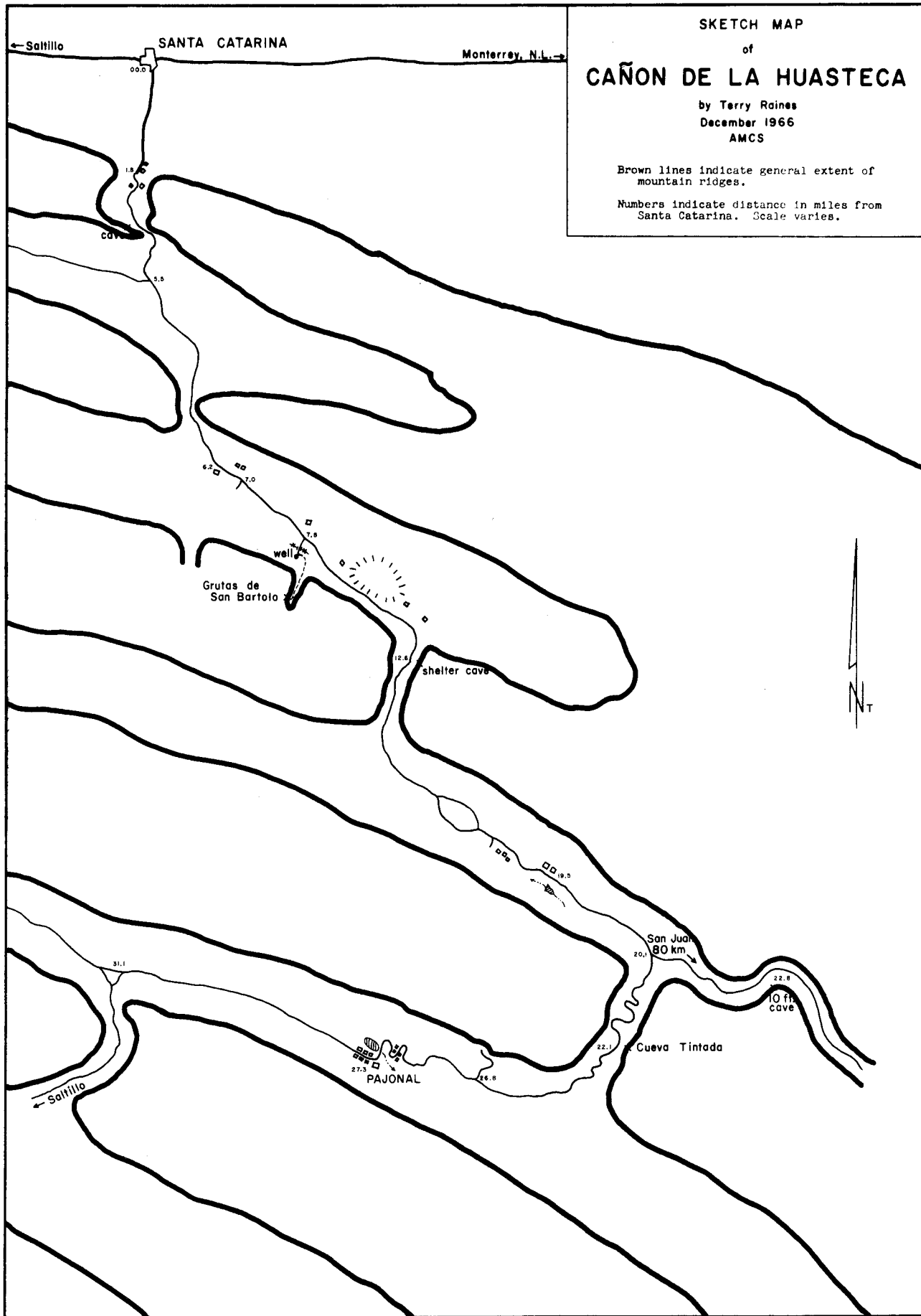
Next we headed for Cañón de la Huasteca, located just to the south of Santa Catarina, N.L. (See sketch map on page 141.) As we entered the canyon and began following the arroyo upstream, we observed almost vertically bedded limestone. (See photograph on page 142.) Knife-edge ridges rising several hundred feet were all around us. We had leads to several caves, but before visiting these we planned to cave-hunt at the upper end of the canyon. The road turned out to be very rough and dusty and after nearly 3 hours of steady driving we arrived at a junction, only 18.3 miles from the mouth of the canyon. To the right a road leads up a narrow side canyon to Pajonal, while straight ahead the road continues up the main canyon. A sign indicated that it went to San Juan, so we took this road. Passing a deserted truck, we next met another that was stopped due to lack of water. The driver informed us that there were no caves in the immediate area and that it was almost 50 miles to San Juan. We had come only 3 miles since the junction, which took an hour, so we turned back. The day was late and we still hadn't seen a cave. We decided to visit Grutas de San Bartolo, a well-known cave in the area. The dust choked us for

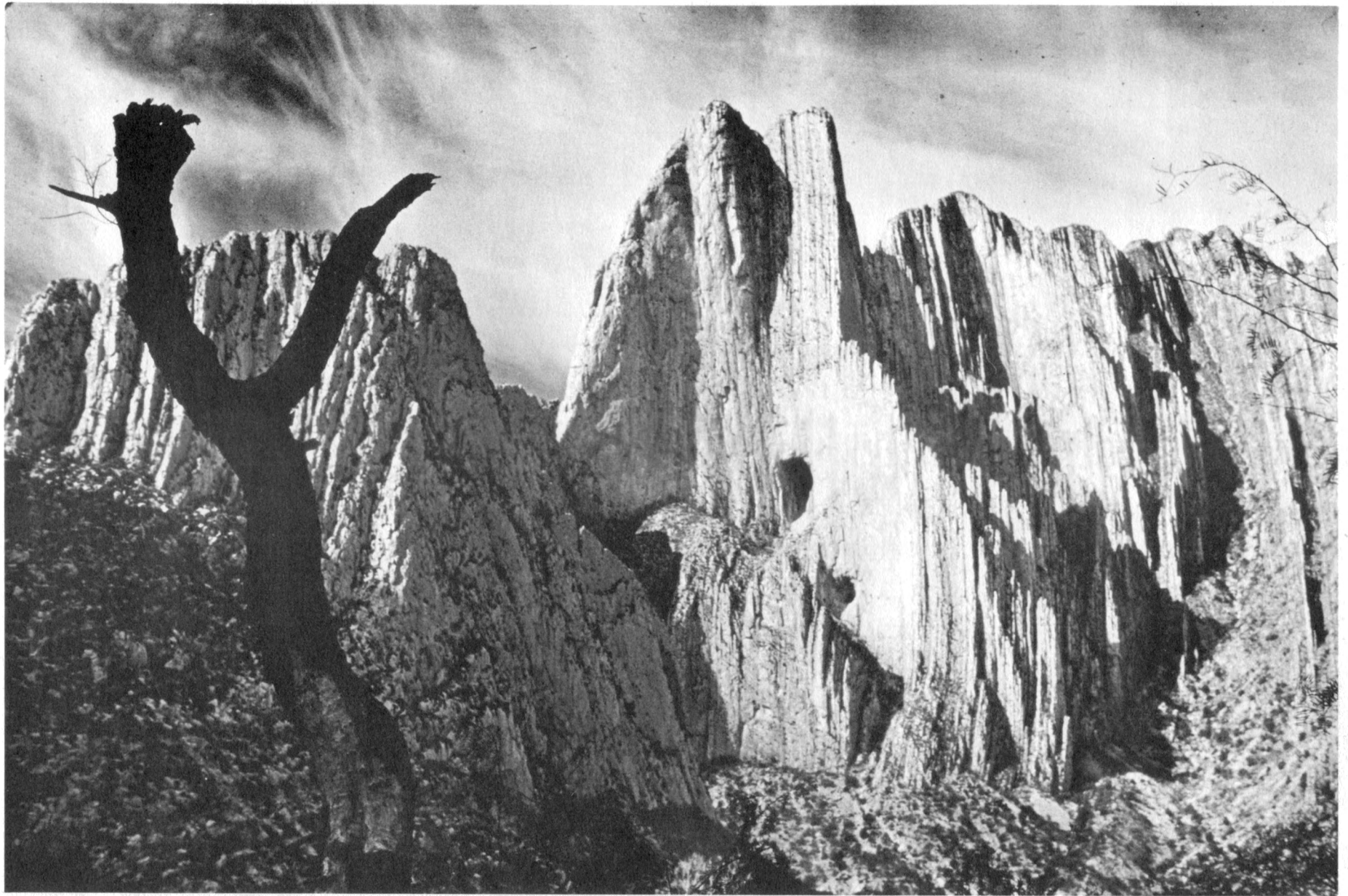
SKETCH MAP
of
CAÑÓN DE LA HUASTECA

by Terry Raines
December 1966
AMCS

Brown lines indicate general extent of
mountain ridges.

Numbers indicate distance in miles from
Santa Catarina. Scale varies.

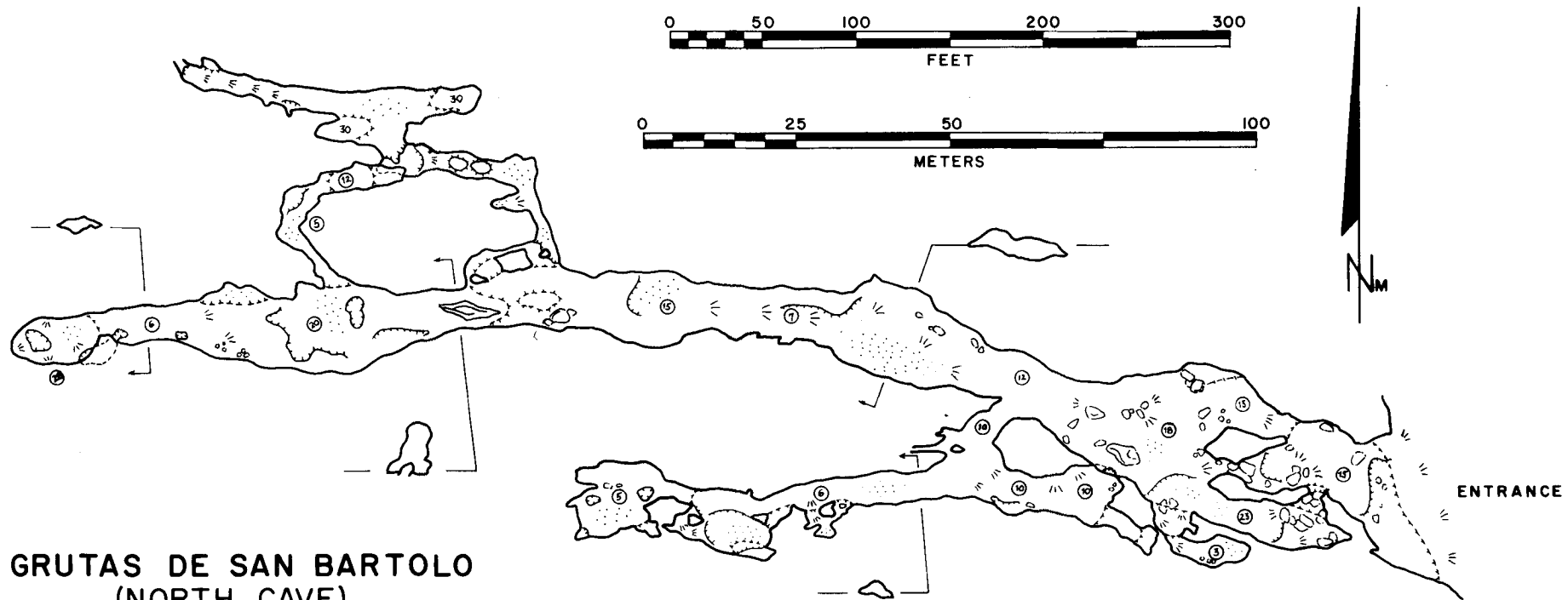




CANÓN DE LA HUASTECA. Cave is developed in vertically-bedded Cretaceous limestone.
Photo by Terry Raines

another 15 miles before we turned left on a side road for a short distance and parked at the base of the mountains. A trail led from a hand-dug well by which we had parked, up a steep north-south trending side canyon, and into the cave. We estimated the trail to be one mile long and several hundred feet gain in elevation. Grutas de San Bartolo turned out to be two separate caves, both on the east side of the canyon and perhaps 200 feet above the bed of the arroyo. The southmost cave is reached first as one follows the trail. From here a trail leads back north at a higher level to the northmost cave. (For a map of the north cave see page 144.) Our findings in the two caves were of biological interest. In the southmost cave we collected several varieties of spiders, a scorpion, and a large black beetle while in the other cave we found a bat, Mormoops megaphylla. For a description of the caves see AMCS Newsletter, v. II, no. 2, p. 21. The hike down the arroyo was in the dark, and after loading our gear in the truck, we headed straight out of the canyon. It was only 6 miles back to pavement. From the entrance of the canyon we drove through Santa Catarina, then Monterrey, and south on the Inter-American Highway. Just before Villa de Santiago (about 22 miles from Monterrey) a rough gravel road east was taken, past the La Boca Dam, to a campsite in the river valley on the other side.

4 December On downstream from where we camped, on the south canyon wall, is Cueva de La Boca. (See map on page 145.) As in Grutas de San Bartolo, we simply explored the cave and made insect collections. (See AMCS Newsletter, v. II, no. 2, p. 22 for a description of Cueva de La Boca.) The collection included beetles, millipedes, and spiders. Of note was the new 110 foot tower paralleling the old one, which gives access to phosphate mining operations in the upper levels of the cave. The tower is made of steel and looks far superior to the old, dilapidated, rotten, wooden one at its side. But looks are deceiving. As is characteristic with many Mexican mining structures, it was built as cheaply as possible - the largest size angle iron used was only 1/8 inch thick. For lateral support it used the old tower and various formations along the way. In the middle it was out of vertical alignment by over 2 feet. To make climbing possible sections of ladder were attached with bailing wire, and this same wire was also used towards the top of the tower when the angle iron supply became depleted. The climbing of this tower, and the succeeding narrow wooden ladders that led up into the dome, required a strong mind with an ability to think of other things. We estimated the dome to be at least 500 feet high, but we never could actually see the top, even with a powerful flashlight. By the middle of the afternoon we were out of the cave, back to the truck, and heading for Austin.



**GRUTAS DE SAN BARTOLO
(NORTH CAVE)**

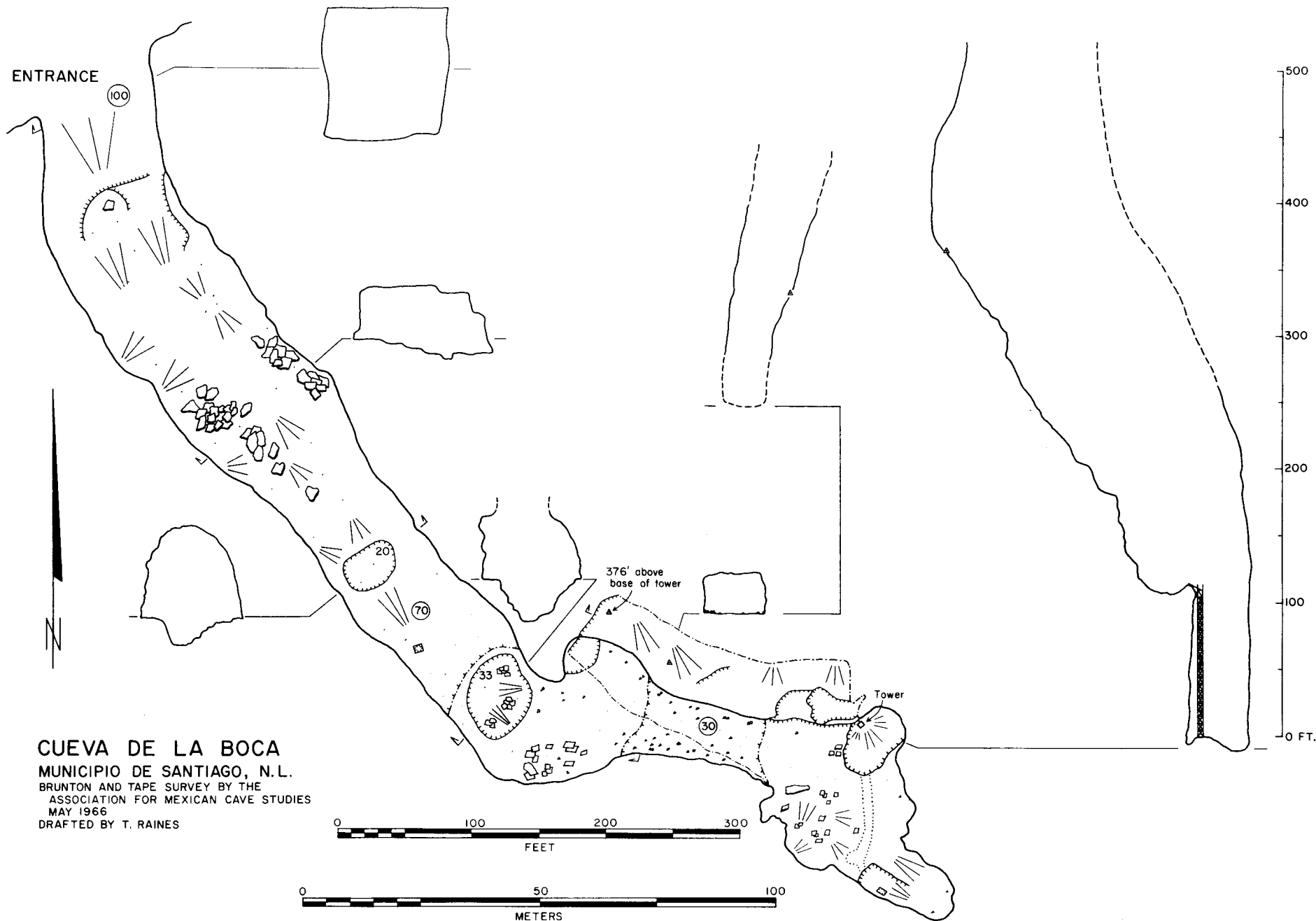
MUNICIPIO DE SANTA CATARINA, NUEVO LEON

BRUNTON AND TAPE SURVEY BY D. MCKENZIE, M. MEREDITH,

W. RUSSELL, C. WESTMORELAND 5 FEBRUARY 1966

DRAFTED BY C. WESTMORELAND, T. RAINES

ASSOCIATION FOR MEXICAN CAVE STUDIES



CUEVA DE LA BOCA
 MUNICIPIO DE SANTIAGO, N.L.
 BRUNTON AND TAPE SURVEY BY THE
 ASSOCIATION FOR MEXICAN CAVE STUDIES
 MAY 1966
 DRAFTED BY T. RAINES

- Persons: Richard Finch, Bob Hosley, Alan Lenk, Ron Richards,
Jim Rodemaker, Ed Yarbrough
- Date: 20-30 December 1966
- Destination: Sótano de Tlamaya and the Xilitla Region, S.L.P.
- Reported by: Bob Hosley Indianapolis, Indiana

Besides our intended visit to what then was the deepest known cave in the Americas, our plans had included back-packing into a relatively unexplored area along the Arroyo Seco. The plans had been worked out with John Fish who was most helpful in providing a map and in making additional suggestions for profitable areas for cave-hunting. On a previous visit we had encountered disappointment on the part of the Presidente of Xilitla that no one had explored a sótano on his property. We had resolved to do so to better relationships and also, hopefull, to discover one of those greatest-of-all-caves: incomparably big, or deep, or wet, or what-have-you. We emerged from the Presidencia with our customary letter and a small guide leading us to the store of Sr. Eliseo Pelaez Campos. Sr. Pelaez had come to Xilitla within the year and had purchased the Presidente's ranch, sótano and all. Pelaez, a new friend to cavers, speaks English and soon had us exploring three openings on his property at the west edge of town. None proved large. To aid our own memories and, in the absence of other known names, we assigned one to each of the pits or caves we explored. A brief description of these caves and a general location follows.

20 December Sótano de la Vaca on the property of Sr. Eliseo Pelaez, Xilitla. Total drop 70 feet, 50 feet down to the floor of a room and 20 feet farther down a crevice. At the bottom is a short passage and a dead cow and numerous cow bones. We suggested to Sr. Pelaez that he fence off the pit from his wandering cattle.

Sótano Redondo on the property of Sr. Pelaez. Single, rountunda-like room about 20 feet in diameter. Total drop about 25 feet to a water run-off passage that pinches too tight to continue.

21 December While looking for Sótano de Huitzmolotitla to watch the bird flight at dusk, my memory played a trick and I got the wrong location. In the search for the pit in growing darkness, we came upon an entrance about 15 feet across that sounded deep. Lighted bundles of dried banana leaves suggested the same, blazing bright as they finally came to rest on the bottom. The pit, Sótano de Suchallo, is a straight-sided shaft 205 feet deep. There is a short solution passage extending about 20 feet from the bottom. We found that we were not on Rancho de Huitzmolotitla, but the ranch nearest it in the direction of Xilitla belonging to a Sr. Caviarez (?). The pit is only a short distance down the hill from the road and very near the property line of Huitzmolotitla. There are several other openings on this property - their presence leading to the demise of our original plans since we were not aware of anyone having checked out these openings. The ranch manager was most cooperative in pointing them out. Sótano del Escorpión is very near the ranch manager's home and has an entrance about 3 feet across. The total depth of the pit is 192 feet, and it narrows somewhat toward the bottom. In fact, there was just room for Ron and I and a large scorpion who eyeballed us with mixed emotions while I hurriedly ascended. There are no passages off the pit.

Sótano de las Raíces, on the same property, has a large and picturesque entrance draped with hanging vines. It turned out to be another 200-footer without passages. Some other smaller pits were found and explored on this property very near Sótano de Suchallo and there remain at least three openings near the floor of the valley which we did not have time to enter. Also, on the slope opposite the manager's house (away from the road, down to the valley floor, and up the other side) there is a cave opening with a stream coming from it which we did not get to see. (Ed. note: Several of these caves were explored during July, 1966. See AMCS Newsletter, v. II, no. 4, p. 79, 80.)

22 December Back to Sr. Pelaez's ranch to explore the largest of his caves, Sótano de la Poca Ventana. (Ed. note: Dr. F. Bonet refers to this cave as Cueva del Ahuate Núm. 2, in his book "Cuevas de la Sierra Madre Oriental en la Region de Xilitla," 1953, p. 58.) This cave has a large entrance room with an opening under a ledge at one end of the room. A short descent leads to a large walking passage decorated with flowstone formations and then to a large, partially alluviated room. There is also a formation-filled grotto with a small pool which is reached by a short solution crawl. A chimney descent and a drop totalling about 20 feet leads to a 230 foot drop at the bottom of which is a small, mud-floored room with a small, round, window-like solution hole. There were quite a few bats present, including vampires, and it is possible that more passage exists than what we found.

Some of our group chose to visit Sótano de Huitzmolotitla and to watch the bird flight. Only the initial 364 foot drop was descended.

23-24 December Sótano de Tlamaya once again. Impressive and intriguing as ever though quite a few "cultural artifacts" have crept their way into the confines of this cave. Turned back once again at a level maybe 80 to 90 feet from the lowest point in the cave where one traverses a 2 inch ledge against a mud wall over a deep pool. Not dangerous in any way — just the thought of being soaking wet and 14 hours from the entrance. On the way out we caught a half-hour's sleep in the Big Room until Eddy's teeth went off like an alarm clock. We shivered onward, gathering our great bundles of rope.

25 December The village square in Xilitla transformed itself into a colorful Christmas bazaar which we enjoyed — our Jeep serving as an anchor point for a sun tarp under which shoes and sandals were sold.

26 December We headed to Tlamaya again and located the entrance to Sótano de la Gorra but found that we were still somewhat exhausted from Sótano de Tlamaya then headed for the beaches of Tampico for a short rest-cure after stopping to look at Cueva del Salitre.

27-30 December On return we stopped to visit Sr. Martínez and to see Sótano de la Tinaja, Grutas de Quintero which at one time had been commercial, and the picturesque Nacimiento del Río Mante.

- Persons: Jim Huckins, Jim Glock, Robert Batson, John Wagner,
Robert Taylor (from Missouri)
Hilda Fleshman, Barbara and J.H. Schermerhorn
(from Arkansas)

Date: 18-31 December 1966

Destination: Tamuín and Xilitla, S.L.P.; México, D.F.

Reported by: J. H. Schermerhorn Harrison, Arkansas

Since none of our group had ever been to Mexico, we did not know exactly what to expect in crossing the border and how we would find our way around in a different country. For several months before the trip I began to collect road maps and publications about caves in Mexico - no easy task. The most useful reference was a collection of the back issues of the AMCS Newsletter. Finally in Mexico City I found an excellent official tourist road map. It was the only one that seemed fairly accurate and complete.

18-20 December Left Harrison, Arkansas, stopping in Austin to check with the AMCS concerning recent developments in Mexican caving before crossing the border. Spent the night of the 20th near Villa de García, N.L.

21 December We took the exciting cable car ride up to the entrance of Grutas de Villa de García and went on the commercial tour. We were impressed by this cave, which was our first to visit in Mexico. We were anxious to get on the way and do some spelunking after seeing tourist caves for 4 days. We drove to Cd. Valles, S.L.P. where we spent the night.

22 December After a few wrong turns we reached Ventana Jabalí near Tamuín, S.L.P. Several hundred feet below the entrance was a camp of about 30 miners who were apparently mining guano from the cave. They had cables stretched up to the cave with two 55 gallon barrels attached so that when a full one would come down from the cave the empty one would be pulled up. We got permission to enter the cave from the foreman. We were impressed by the beautiful view from the entrance and the tall ceiling heights and skylights. Because it was getting late, we didn't attempt to rig the 503 foot skylight drop but drove to Xilitla, S.L.P. where we spent the night.

23 December Just as we reached Sótano de Tlamaya a group from Indiana, led by Bob Hosley, was descending the first drop. We returned to Rancho de Huitzmolotitla and set up camp; we were surprised to find so many other cavers from the U.S. in the area. We measured and cut our 1200 foot spool of Samson rope which had arrived from the factory only a few hours before we left Arkansas. We then went to Cueva de Tlamaya, which has a total depth of 316 feet.

24 December This was to be our day to enter Sótano de Tlamaya as we expected the Indiana group out by noon. Most of the other cavers left for a 3-day back-packing trip into the mountains. That afternoon we walked down and looked into the awesome, jungle-covered Sótano de Huitzmolotitla. We then did some hiking in the area, but didn't go far as it had been drizzly and foggy the entire two days. The people at the Rancho invited us to a Christmas Eve celebration and we enjoyed the fine hospitality.

25 December We entered (only 4 of us: Batson, Taylor, Huckins, and myself) Sótano de Tlamaya about noon, taking many still photos

and color motion pictures. The first drop is no less than spectacular in size and beauty. However, it was a disappointment to find much refuse in the Entrance Room. The cave was very dry and we proceeded easily to the top of Fossil Pit. Here we thought of the 3 heavy cameras we had with us and the 60 pounds of motion picture equipment which was left just above the Entrance Room. So out we went, taking still and motion pictures until the batteries in our flood lights went dead. It was a very enjoyable trip, but the photography equipment made it a lot of work.

26-31 December The members of our group from Missouri returned directly to the U.S. while the three of us from Arkansas continued south to the Pyramids of Teotihuacán and Mexico City for some sightseeing. Afterwards we returned to Monterrey by way of Highway 57, a much shorter route than Highway 85.

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- Persons: Ron Bridgemon, Chuck Pease, Ken Krans, Dave Nelson,
Cort Schuyler (from Arizona)
Larry Clark, Tom Thompson, Tony Thompson, Diana Hooton
(from Utah)
Kirk Holland, Richard Schreiber (from Tennessee)
 - Date: 16-31 December 1966
 - Destination: Xilitla, S.L.P. Region
 - Reported by: Ron Bridgemon Tucson, Arizona

16-18 December Car trouble delayed the vehicles from Arizona and the complete group did not cross over into Cd. Juárez, Chih. until noon of the 18th. From there we continued toward Torreón, Coah.

19 December Twenty-five miles south of Matehuala, S.L.P. we stopped to check two dirt sinks similar to those described by Reddell near Galeana, N.L. (See AMCS Newsletter, v. II, no. 3, p. 50.) Both were about 60 feet wide and 30 to 40 feet deep. It would be interesting to see if this was a continuation of the gypsite formation of the Galeana area. We passed through Cd. del Maíz, S.L.P. about 5 p.m., then passed through a very interesting limestone area. East of Maíz the limestone was observed to dip nearly vertical. Several entrances and sinks were spotted but none were investigated. At midnight our caravan stopped to camp at the mouth of Arroyo Seco just outside of Xilitla, S.L.P.

20 December We pulled into Xilitla about 10 a.m. and met some Indiana cavers who were about to check a sótano just west of town. We went on to the plaza to obtain a letter of permission and introduction but both the Presidente and clerk were out. We were assured that this was an unnecessary formality. (Ed. note: Cavers should always check with local officials before entering any caves unless it is known definitely that cavers have standing permission.) A crew of awe-struck cavers made their way along the beautiful mountain road to Rancho de Huitzmolotitla. After many photographs we arrived at the rancho and introduced ourselves to Sr. Larios who welcomed us warmly and graciously allowed us to camp on the patio of the ranch. After camp was put in order the group walked into the village of Tlamaya where we met Sr. Toribio Marqués who along with his two little daughters took us to the entrance of Sótano de Tlamaya. We would enter the cave a week later unless we were tied up elsewhere. Sr. Marqués agreed to show us the local caves the next day.

21 December At last we were ready for some serious work. The party was divided into two search teams, I headed Team 1 and Ken Krans was in charge of Team 2. My group was to go with Sr. Marqués as arranged the day before. Since we intended to use the day only to familiarize ourselves with the local and known caves we only carried two lengths of rope, a 150 foot and a 60 foot section, and 30 feet of cable ladder. With this gear we could enter far enough to recognize a cave by description. To our surprise we were taken to a sótano just 1/2 mile southwest of Tlamaya and called La Gorra by our guide. Neither name or appearance was familiar to me so we decided to have a look. The entrance is 70 feet across and 150 feet long. We had already determined by rock fall that we didn't have sufficient gear to reach the bottom of the entrance drop, but we used all we had brought in order to get a good view — and what a view! The first 70 feet is nearly vertical and then the wall undercuts, revealing 273 feet free to the bottom. The walls of the shaft get farther and farther apart the deeper one descends. We left La Gorra with plans to return the next day with more rope.

Sr. Marqués then led us back along the ridge toward Tlamaya and pointed out several pits that we didn't check. We then arrived at a huge rectangular sink, 200 by 150 feet and 50 feet deep. Hacking our way to the far wall of the sink only revealed a 500 foot horizontal cave. We then were shown two pits, 140 and 90 feet respectively, that were both blind shafts.

Search Team 2, accompanied by Dan Evans (Austin, Texas) went into the high country northwest of Tlamaya along the route called "Camino Real" by the local people. They saw many sótanos and found a guide who promised to take them the following day to a sótano which no North Americans had ever seen. This was supposedly at an elevation in excess of 6500 feet.

22 December Both teams headed off to their respective areas. Team 1 went to La Gorra with a 600 foot length of rope plus the gear of the previous day and an additional 100 feet of cable ladder. Team 2 took only 2 lengths of rope as they had a miserable 6 mile hike ahead of them and the main objective was to only locate the high sótano.

El Gorro was reached and the time consuming task of rigging got under way. The 130 feet of ladder was tied directly to a tree one foot from the brink. It was to be used by Cort who went down first in order to photograph people going to the bottom. He hung there an hour and a half. Approximately 360 feet of the long rope was lowered into the pit and Cort said it was on the bottom. I was first to drop over on rappel and it was a magnificent sight to see a man swinging at the end of 130 feet of ladder with 213 feet of space below him. When I reached the bottom I was surprised to discover myself next to a 60 foot high breakdown pile. From the top the bottom looks absolutely level. Dave, Larry, Tom, and Chuck came down next. The entrance drop measured 343 feet, 273 feet completely free. The total depth of the cave was 426 feet and a rough sketch was made of the area at the bottom. After a quick meal we prusiked out, the last man making his exit at 9 p.m. Just as all the gear was packed a yell came from across the valley. Team 2 was also returning.

Back at camp Ken related their activities. Team 2 had picked up their guide and then made a grueling hike toward the highest

ground in the area. (See photograph on page 152.) Along the way they were shown a horizontal entrance 7 feet high and 20 feet wide. They were told that they were the first North Americans to see the cave but it was not checked since the main objective was the sótano. Only three of the team managed to fight their way to the sótano's entrance as the last 1/4 mile of trail was made as they went. Evans said that it was one of the best sótano entrances he had seen and estimated the drop at about 200 feet. As it was quite late already they headed back toward the rancho.

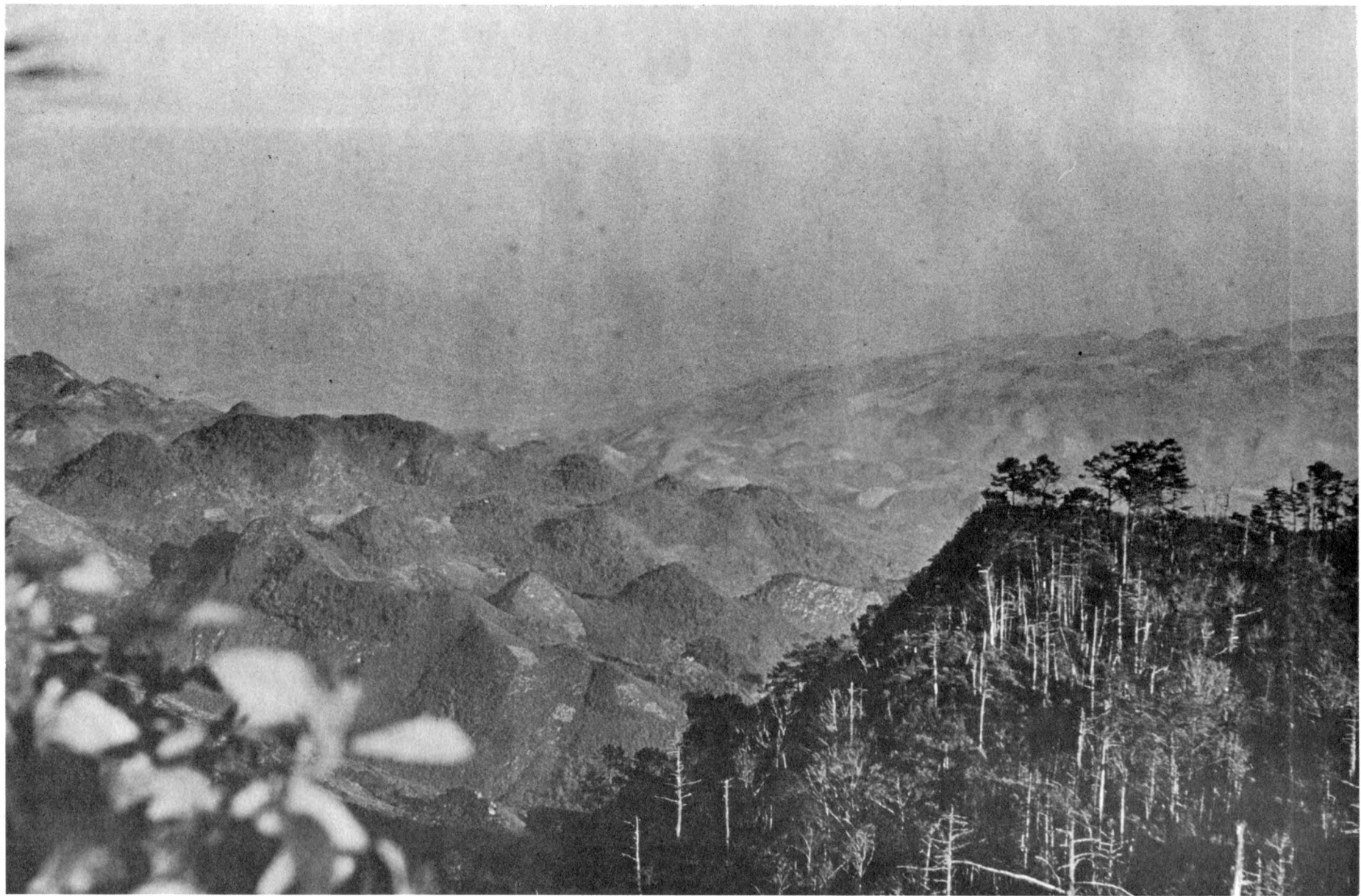
23 December Today was declared a day of rest as both teams planned to hike up to the newly located sótano the next day and spend two days away from base camp. A trip was made into Xilitla and we passed the Arkansas-Missouri crew on the way. In the afternoon Richard and Kirk descended into Sótano de Huitzmolotitla to the bottom of the entrance drop.

24 December We made last minute additions to our back packs, and packed our 2700 feet of rope. It had rained the day before and the weather still looked far from encouraging for our hike. A thick cloud cover entirely concealed the top of the mountain range and our rock-spire landmark, La Silleta. Larry and myself had come down with colds so things looked bleak.

In Tlamaya we made arrangements to rent two burros to haul our ropes the 6 miles to our new camp, the horizontal cave seen by Team 2 on their previous sojourn. The 10-year-old son of the owner accompanied us to drive and care for the burros. Travel was slow with the burros and one stumbled and fell 3 times on the steeper portions of the trail. Each time it was necessary to unload the animal in order to get him back on his feet. The trail finally became too steep for the burros about 1/8 mile below the horizontal cave. They were unloaded and the boy took them back to Tlamaya with instructions to return to the same location in two days. Much effort was expended in getting all of our gear up that final, steep slope and the last of it didn't reach the cave until about 9 p.m.

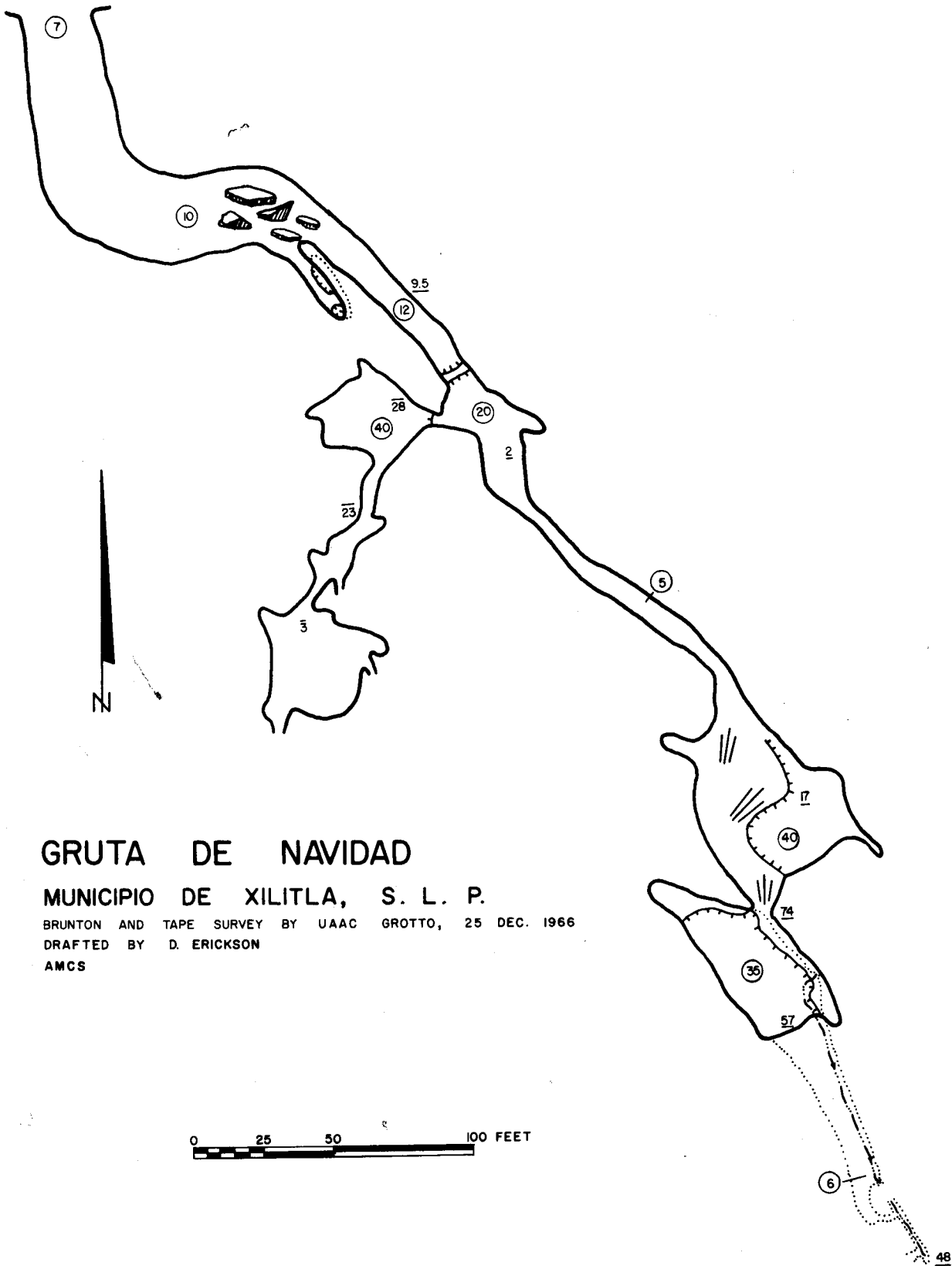
25 December Again we divided into teams in order to accomplish the maximum in the short time we had. Four of the group went up to the sótano, which we named Sótano de La Silleta. They started off on the last horribly steep mile with about 1600 feet of rope. The others and I remained and surveyed the cave in which we had camped. After completion of the survey we were to join the other group with the remainder of the rope. If their gear had been exhausted we would go in and push farther while they rested back at camp.

The cave of our camp, duly christened Gruta de Navidad (see map on page 153), is essentially a joint-controlled passage that slopes gently up as one goes in. A small arroyo begins at the cave entrance, indication that water discharges have occurred in the past. A small active stream issues from the back of the cave, courses along the eastern wall for about 100 feet, then disappears into the wall. The back portion of the cave is well decorated and extremely wet on the western side, this water adding greatly to the flow of the small stream. A side passage trends to the southwest from the main passage about 200 feet in from the entrance and is lower than the rest of the cave, thereby being quite muddy. We surveyed 850 feet in Gruta de Navidad with only a couple of crawls left unchecked.



XILITLA AREA. View east from the base of the La Silleta pinnacle. The Tlamaya solution valley is in right-center and the Inter-American Highway runs north-south through valley in upper-center. Photo by Danny Evans

ENTRANCE



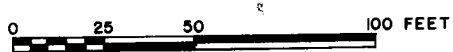
GRUTA DE NAVIDAD

MUNICIPIO DE XILITLA, S. L. P.

BRUNTON AND TAPE SURVEY BY UAAC GROTO, 25 DEC. 1966

DRAFTED BY D. ERICKSON

AMCS



Once back at camp Chuck checked a small hole located just to the west of Gruta de Navidad. Although this cave is smaller, it is much more active and much better decorated. As we then used the water from a gourd in the entrance room we decided to call the cave Cueva de Agua.

After lunch 3 of us took the remaining rope and struck off for Sótano de La Silleta. It was a fight up moist dirt and vegetation and I was beginning to think that I should have remained in camp. Near the top of the ridge we yelled and Kirk answered. He came down and led us along the newly made trail to the sótano. He had been down the entrance drop but because he had lost his carbide lamp on the hike to the cave he could not continue. Kirk said that the others had kept on going down and he had last heard from them 4 hours earlier. We waited at the brink of the large entrance for an hour before the group in the cave returned. Kirk and I took all the gear we could carry and started back to Gruta de Navidad. Back at camp Richard and Dave briefly described the cave. Richard said that a conservative estimate would place their point of penetration at 700 feet below the entrance. Dave exclaimed that it was one of the most beautiful caves he had seen. (See, "Notes on the Exploration of Sótano de La Silleta", on page 155.)

26 December We struggled out of bed and lugged the ropes and other gear down to the point where the burros were to meet us at noon. Chuck decided to stay at the high camp another day in order to locate caves for future investigation. Several were found. The boy and the burros were right on time, and we made a quick trip back to Tlamaya where we paid our fee of 25 pesos for the use of the burros. We got back to base camp at the rancho at 5 p.m. and met Sr. Rafael González Cisneros, the new owner of Rancho de Huitzmolotitla. We thanked him for permitting us to camp on his ranch and he said that we were always welcome.

27 December After taking it easy until 11 a.m. Richard, Kirk, Dave, and I decided to tackle Sótano de Tlamaya. The entrance pit was entered at 12:30 p.m. Everything went smoothly, though the cave was quite wet, and the end was reached at 6 p.m. To speed up the return, we split into two teams: Kirk and I, and Richard and Dave. Kirk and I headed straight for the Big Room and stopped for a meal. Richard and Dave derigged the drops, giving us all the ropes when they reached the Big Room. The two of us then took off while they stopped for their dinner.

28 December Our team method worked beautifully and Kirk was out of the sótano by 3:30 a.m. He went to the rancho for the truck to haul our gear as well as get some dry clothes for all of us. Richard and Dave were now at the bottom of the entrance drops, and after hauling rope up to my level, I started up the last prusik of 279 feet. Dave came up next and the 3 of us hauled up some of the rope. After much trouble with the rope getting snagged, Richard exited the cave 16 hours after we had entered. The rest of the day was spent sleeping and eating.

29 December Our group reluctantly broke camp as we prepared to leave this great cave area. We thanked Sr. Larios again and started the driveathon back to Tucson, Arizona.

NOTES ON THE EXPLORATION OF SOTANO DE LA SILLETA

by Richard Schreiber

The entrance to Sótano de la Silleta was located on 22 December by a reconnaissance party consisting of Dan Evans, Tony Thompson, Kirk Holland, Ken Krans, Richard Schreiber, and a Mexican guide.

On Sunday morning, 25 December 1966, after spending Saturday night camped in Gruta de Navidad, an initial exploratory team, consisting of Kirk Holland, Dave Nelson, Tony Thompson, and Richard Schreiber, began the 800 to 900 foot vertical climb from Gruta de Navidad up to the entrance of Sótano de La Silleta. The party carried a 600 foot, 270 foot, and two 150 foot lengths of nylon rope plus the normal complement of vertical gear, food, and camera equipment. The hike took a great deal of time and energy as the trail was extremely steep and did not extend to the entrance. It was necessary to make our own trail for roughly 800 feet through the thick growth at the crest of the mountain ridge at the base of La Silleta. This unusual limestone pinnacle rises 400 feet higher. The elevation of the entrance to Sótano de La Silleta is around 6500 feet and pine trees are present, though not in abundance. When we reached the entrance we discovered that Kirk had lost his carbide lamp.

One end of the 600 foot rope was lowered into the Sótano and then tied off at about 350 feet. Richard rappelled down to find that the drop was only 155 feet but that the pit continued downward in a broad, partial spiral at an angle of 45 to 55 degrees. Because of the nature of the slope, it was decided to use the full 600 foot length for the drop and the rest as a handline down the wet, slick slope. Dave, Tony, and Kirk rappelled into the pit. Kirk without his light looked around near the base of the drop then returned to the surface to search for the lamp.

Richard, Tony, and Dave worked their way down the wet flowstone slope descending for about 250 feet, vertically, until the pit appeared to pinch out and end. Close observation produced two small openings which were actually one divided into two by flowstone, making both openings about 2 by 2.5 feet. Through these openings a strong air movement was noted and a small trickle of water flowed. Here a 150 foot length was rigged because immediately on the opposite side a short drop was discovered. Richard, followed by Tony and Dave, made this drop of 30 feet. From here the passage continued downward for roughly 120 feet, vertically, varying in width from 15 feet to 40 feet with ceiling heights of up to 100 feet. The floor of the passage was wet flowstone. Massive flowstone and other speleothems were found along the passage. After following this passage downward we found that it intersected a horizontally-developed cave.

At this point we split into two units: Tony and Dave would go to the left and Richard would go to the right. The passage to the left extended for about 400 feet and terminated in a dome. It varied in width from 15 feet to 40 feet with ceiling heights from 6 to 70 feet or more. Many speleothems of all varieties were noted. The passage to the right consisted of a low, wide stream crawl for roughly 150 feet, then the ceiling increased up to about

20 feet. At this point the passage continued farther for 150 feet where it narrowed down to a 2 foot wide, 3 foot high stream stoop for 25 feet. Beyond the stoop, which contained water to a depth of 2 feet, the passage widened to 20 feet and began descending at 60 degrees or more, requiring much climbing and worming through breakdown. The stream was now following the downward sloping floor. After descending vertically for approximately 75 feet the passage widened to 50 feet and a dry left-hand lead away from the stream channel was found. This was followed for 100 feet horizontally where it descended vertically for 60 feet along a sloping passage which pinched out. The stream passage was followed from this intersection downward for roughly 60 feet, vertically, to a point where the passage narrowed to 4 feet in width and with ceiling heights of 3 feet. At this point a large slab of rock blocked further easy access to the passage beyond. It was noted that the passage beyond sloped at approximately 50 degrees and enlarged again in width. A strong air flow was noted also.

Richard returned to join Dave and Tony in their area of exploration. Many pictures were taken by the trio on the return to the entrance from here. Upon reaching the bottom of the entrance drop, Tom Thompson, one of the support crew of three, was found waiting for our return. Waiting on the top were Ron Bridgemon, Kirk, and Chuck Pease. We prusiked out, derigged the 600 foot rope, then returned to our camp in Gruta de Navidad.

In conclusion, it is our belief that Sótano de La Silleta will be found to be considerable deeper than what was explored on this first visit, approximately 700 vertical feet below the entrance. The group will be returning in the future to survey and further explore this most interesting pit cave.

-
- Persons: Ed Alexander, Tommy McGarrigle, Terry Raines, Bill Russell, Bud Stewart, Tom Tracy
 - Date: 17-30 December 1966
 - Destination: Cacahuamilpa, Guerrero area and Huautla, Oaxaca area
 - Reported by: Terry Raines and Bill Russell Austin, Texas

17 December Nightfall found us arriving in Cd. Mante, Tamps. after spending the day driving from the United States. On the south side of town we took a well-marked gravel road for about 5 miles west to "El Nacimiento del Río Mante". Here a large resurgence is located at the base of the Sierra de El Abra. From this resurgence the Río Mante flows out across the plains to the east, providing irrigation water for the many farms of the region. The area immediately surrounding the Nacimiento has been made into a park which is an excellent camping location. Here we spent the night.

18 December One of the first things noticed was the high water level of the resurgence. Part of the campground and several concrete benches were submerged. This was due to the heavy rains the area has been receiving within the last few months. From the Nacimiento our route took us on south through Cd. Valles, S.L.P. to the turnoff to Xilitla, S.L.P. (new road). Here Danny Evans and Gary Helman, who had come with us from Austin, caught the bus up into the mountains to the west. It was their plan to hike into the high plateau area north of Tlamaya. There they hoped to

obtain a rough idea of how many and what type of caves are located in the area. (See trip report on page 150.) Meanwhile, Bud and I continued on, driving through the rugged mountains between Tamazunchale and Mexico City. Along the road two small areas of barren karst and internally drained depressions were noted. The first was at kilometer post 323 at a place called Tamaulipas and the second was just down the road at kilometer post 317. These locations should be checked for caves as no work whatsoever has been done in this region by the AMCS. Our immediate destination was the National Park at the volcanos of Popocatepetl and Ixtaccíhuatl. After fighting our way through the traffic in Mexico City we passed several small towns and eventually arrived at the park.

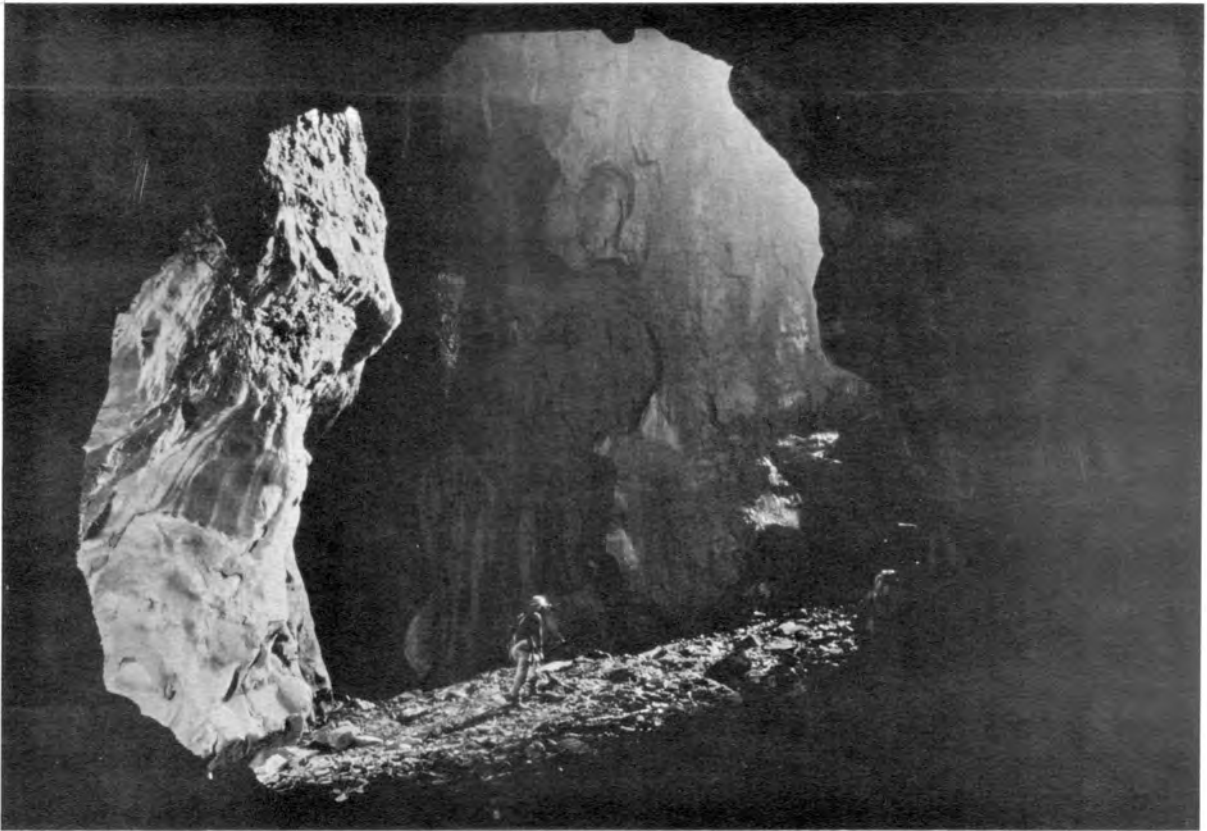
19 December We spent the day climbing on Popocatepetl and viewing the scenery.

20 December Passing through Mexico City, we drove to the commercial Grutas de Cacahuamilpa in Guerrero then turned north on Highway 55. Continuing approximately 5 miles past the state line into the state of México, we arrived at the marked turnoff to Grutas de la Estrella. From here it is 2 km west to the end of the road which overlooks the cave entrance. An arroyo leads into a large depression, at one end of which is Grutas de la Estrella. The portion of the cave we explored and surveyed consists of an underground river passage blocked by a deep pool 595 feet from the entrance and a 950 foot long upper level loop containing many formations. This day we surveyed the upper level loop with the exception of two side passages.

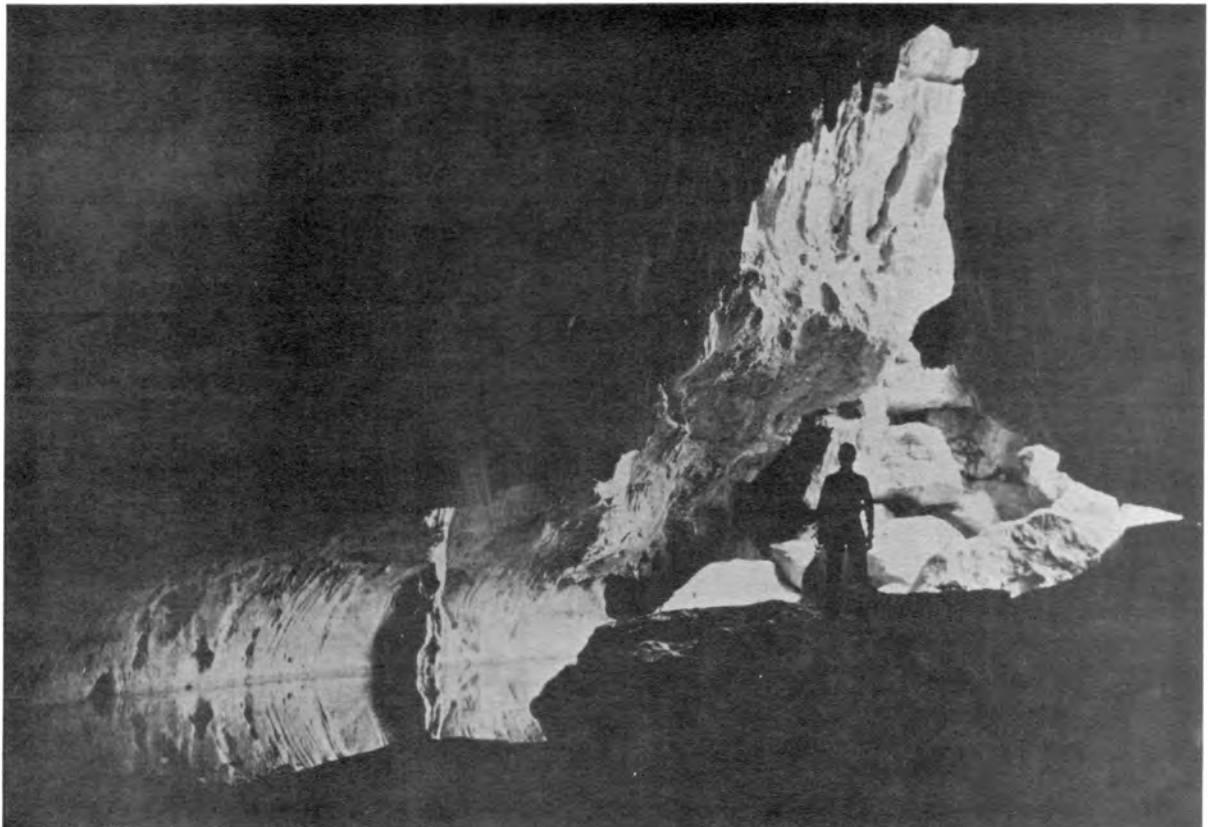
21 December We returned to the cave and began mapping where we had left off the day before. From the entrance the large stream passage continues for 217 feet before dropping. At this point a wooden bridge has been built along the left wall overlooking the drop and it leads to the upper level loop. (See photograph on page 158.) It required several hours to map the two side passages off the loop and check for other leads. With this section of the cave complete we returned to the entrance. Bud decided to return to the truck while I went back to survey the downstream section past the first drop and wooden bridge. This proved to be the largest section of the cave, with the passage averaging over 60 feet wide and 70 feet high. After only a few hundred feet I encountered a deep pool completely blocking the way. Because the carbide lamps were growing dim from lack of carbide and the passage only got larger on the other side of the pool, I called it quits. Additional trouble was encountered with the lamps when the strong air currents entering the cave extinguished the flames. I reached the truck by nightfall and we drove back to the highway. Not having decided which cave to visit next, we continued only a few miles south then camped at a place called "El Mirador".

22 December The roadside stop where we were camped proved to be well-deserving of the name "El Mirador" or The Lookout. Immediately on the other side of a stone wall from where we were parked was a cliff over 400 feet high. From its base the ground sloped steeply down for over one thousand feet to the Río Chontalcoatlán at the bottom of the gorge. Upstream this river passes through Grutas de la Estrella. Downstream it is again pirated underground and then emerges from the Río Chontalcoatlán entrance of Dos Bocas 3 km (airline distance) away.

Continuing east, we drove through the village of El Mogote to



CUEVA DE SAN AGUSTIN. Entrance room. Photo by Terry Raines



GRUTAS DE LA ESTRELLA. Passage at entrance. Photo by Terry Raines

Grutas de Mogote, located one mile east of town. Here a large depression has formed with the small sink entrance to the Grutas located in the bottom on the east side. The highway was built so close to the depression that it is now collapsing into it. Bud decided not to enter the cave so I went ahead to make a biological collection. An hour was spent in the cave collecting quite a variety of insects. About noon we left the area, returned to the main highway, and drove south to Acapulco for a day; a refreshing break from caving.

23-26 December After spending the 23rd in Acapulco we returned to Mexico City where Bud boarded a bus leaving for Austin. I continued on to the beautiful city of Orizaba, Ver. where I spent the next 3 days in and around the city visiting several old friends. On Christmas day I hiked to the small Indian village of Tequila, located 10 miles south of Orizaba. This is in an area of a great number of pits, many of which were visited by AMCS members 2 years earlier. On the night of the 26th I met Bill Russell and Tom Tracy in Mexico City. From there we headed to Huautla de Jiménez, Oax. for 4 days of caving.

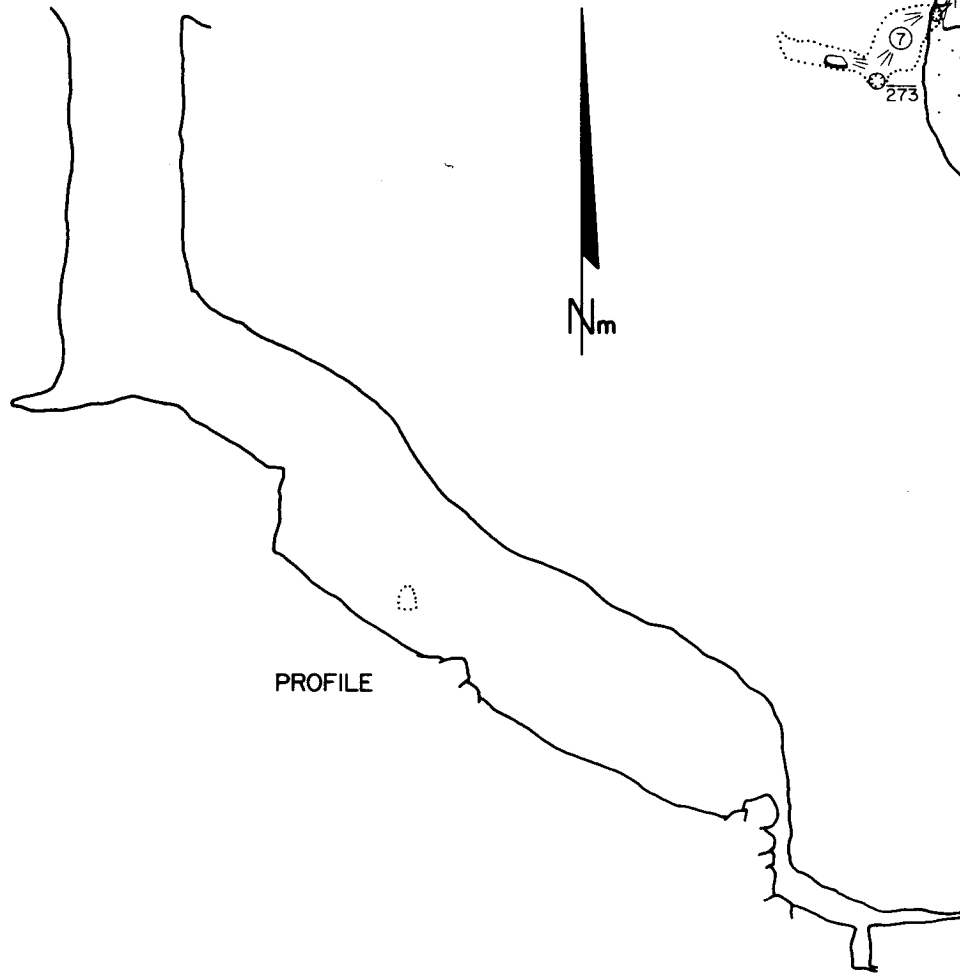
27 December At Tehuacán we turned south, following the broad valley that is the upper basin of the Río Santo Domingo. The climate in this area is hot and dry. After 80 km and several small towns we reached Teotitlán del Camino, the last valley town on our route. From Teotitlán we took a dirt road that winds up into the mountains, heading east. For approximately 20 km it is very steep with many switchbacks; vegetation is still sparse. The road then contours between several passes (elev 2250 m) before descending the remaining 35 km to Huautla de Jiménez (elev 1500 m). Between Teotitlán and Huautla (90 km by road but only 25 km by air) the road literally clings to the mountainsides, several thousand feet above the valley floors. The exciting ride provides quite an experience for those viewing the region for the first time. As one approaches Huautla, vegetation becomes profuse because the clouds from the Gulf of Mexico are blocked by the mountains and forced to drop their moisture. Good cave-forming limestone is not encountered until just past Huautla. After several hours of bouncing along the very bad road we reached Huautla and drove another 6 km to the pass below San Agustín. Ed Alexander and Tommy McGarrigle arrived within a few minutes and we set up camp.

That afternoon Tom, Tommy, and I explored and mapped Sótano del Camino. The cave is located about 1/4 mile from our camp in the direction of Tenango and 40 feet to the left of the road. The initial drop in the 40 by 50 foot entrance pit is 109 feet. A steeply sloping passage about 40 feet high and wide leads downward for 176 feet from the base of the drop. The floor is covered with large breakdown. A small hole between the cave wall and several breakdown blocks leads from the end of the passage into a small lower level. Here the cave reaches its greatest depth of 273 feet. (See map on page 160.)

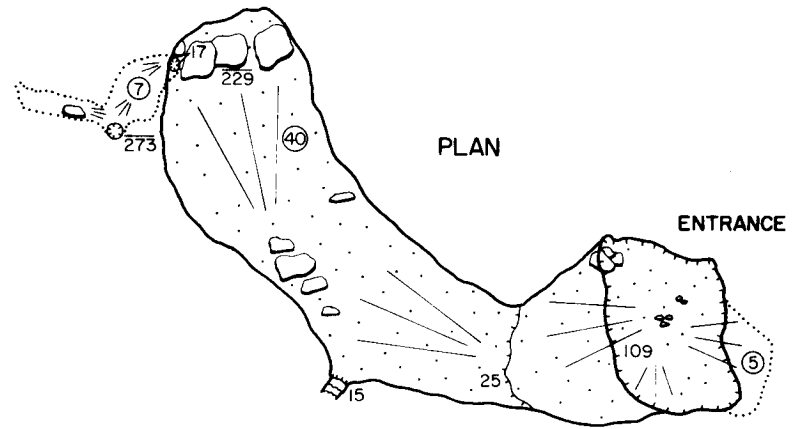
28 December A bright clear day boosted our morale. After having spent the morning locating some known caves in the area for our personal reference we arrived at the entrance to Sótano de San Agustín by noon. Over an hour was spent rigging the rope and chopping a path down through the dense undergrowth which covers the steep entrance slope. (See photograph on page 162.) Tom, Ed, Tommy, and I continued on into the cave, surveying as we went.

FEET
0
30
60
90
120
150
180
210
240
300
330

ENTRANCE



PROFILE



PLAN

ENTRANCE

SOTANO DEL CAMINO

MUNICIPIO DE HUAUTLA DE JIMENEZ, OAXACA

BRUNTON AND TAPE SURVEY BY T. MCGARRIGLE, T. RAINES, T. TRACY
27 DECEMBER 1966

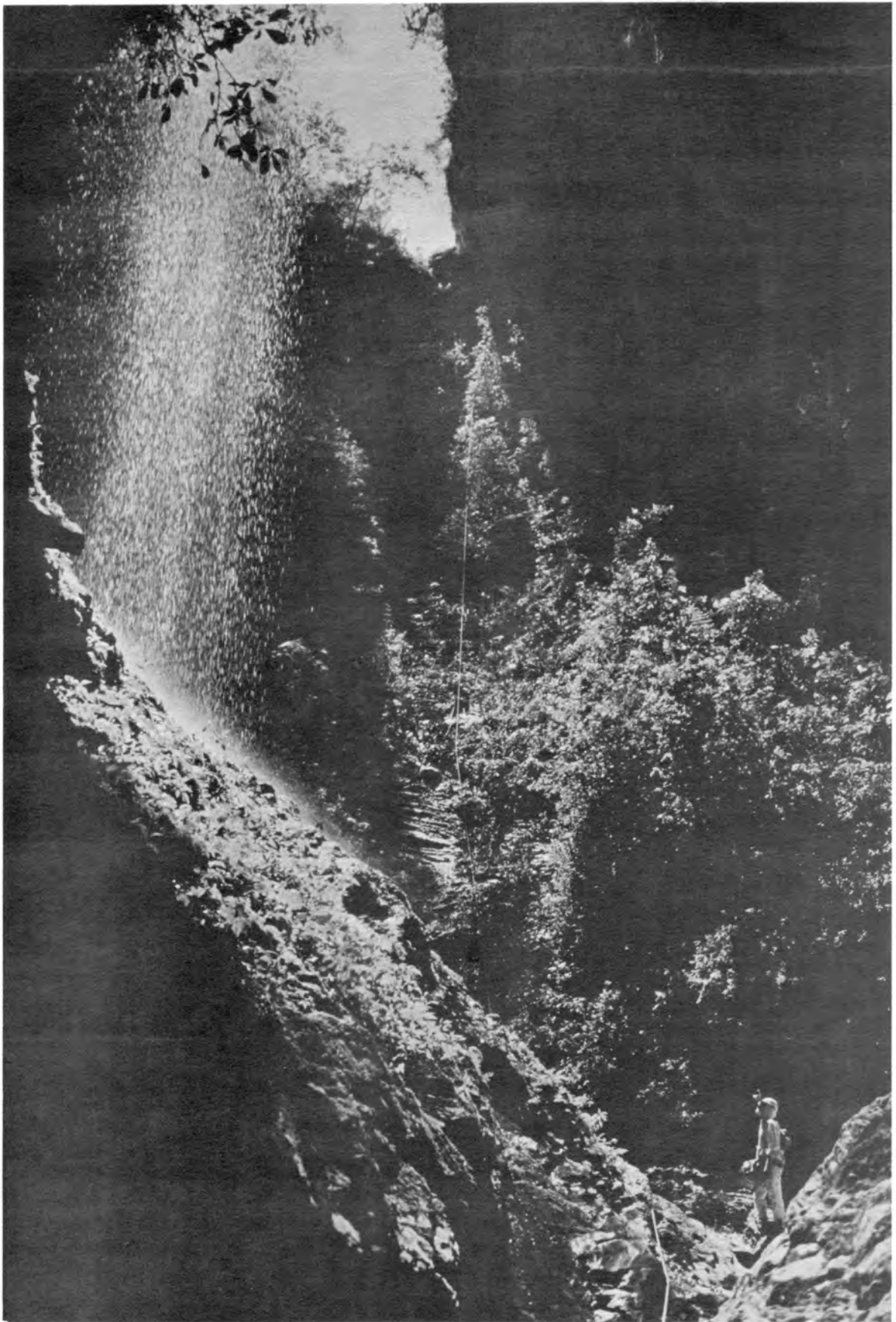
DRAFTED BY D. ERICKSON AND T. RAINES
AMCS

0 30 60 90 120 150 FEET

Past the first large room (approximately 70 feet high, 125 feet wide, and 470 feet long) which is located just inside the entrance, we descended a fissure with several drops before quitting for the day. The greatest pitch was surveyed to be 74 feet while the total of the four was 142 feet. (The cave was explored last June to a point about half way down these drops. For a trip report and description of Sótano de San Agustín see AMCS Newsletter, v. II, n. 3, p. 57.) Our survey showed that we had explored to a depth of 691 feet. At this lowest point was a short pit with a promising passage leading from the bottom. Also noted was a strong wind blowing into the cave. It was impossible to keep a carbide lamp lit in the narrower sections of the passage. We decided to leave all equipment and ropes in place so that our farthest surveyed point could be reached quickly the next morning and exploration continued.

While the four of us spent the day in Sótano de San Agustín, Bill Russell located several caves in the San Miguel Dolina. This large dolina is located just to the north of the town of San Miguel. (See location map in AMCS Newsletter, v. II, no. 3, p. 61.) At the southeast end of the dolina a steep arroyo leads from below the church and enters a steeply sloping cave. This cave was explored downward for about 100 feet, with the passage about 20 feet high and 15 feet wide. Floodwater enters the cave and it appears to be promising. Northward from the cave below the church a field slopes toward several dirt sinks at the base of a cliff, none of which appear promising. From the field a narrow pass leads north-east to a circular, flat area at the bottom of the dolina. On the east side a small sink leads to a possible cave, and on the west is a large cave entrance by an almost isolated block of limestone. This entrance leads to a series of parallel fissures extending back toward the dirt sinks. There is a 15 or 20 foot drop at the main entrance but the cave can be entered without equipment through a second entrance, a gully sink around the corner to the west of the main entrance. The main fissure extends about 300 feet from the entrance as a passage about 25 feet wide and 50 feet high. Before it ends, a window opens into a parallel fissure whose floor is about 40 feet below the window. This lower fissure can be easily reached by following a small passage downward from the end of the main entrance fissure. A small stream flows over a large flowstone bank, across one end of the lower fissure, and into a small muddy crawlway. North of this fissure cave a gully from the steep mountainside enters a shallow sink at the edge of a field. From this sink, which is about 5 feet deep, a low, horizontal, elliptical passage extends for about 200 feet to a 40 foot pit. This passage gradually enlarges and is walking-size before the pit. Due to the lack of equipment this pit was not explored but estimated to be 60 feet deep.

29 December We hurriedly entered Sótano de San Agustín in order to escape the dense fog and low-lying clouds that are so characteristic of the rainy season of the summer months. Once inside it took less than one hour to reach the -691 foot depth of the day before. With Ed running the Brunton, Tom and Tommy handling the chain, and I sketching, we proceeded down the next drop. The 48 foot rappel brought us to the beginning of another section of horizontal passages. This was evidently one of the main routes flood water took because the walls were scoured clean and the floor was covered with rounded stones up to 8 inches in diameter. A "T" intersection was encountered 237 feet from the drop at a depth of



SOTANO DE SAN AGUSTIN. View looking up entrance slope of 269 feet.
Photo by Terry Raines

-749 feet. The left-hand passage leads to a second stream passage similar to the one we were following. Both contain small streams and lead, by way of short drops, to a horizontal passage at the -834 foot level. Here the walls are covered with mud and the floor has pools and banks of mud and sand. The stream is sluggish and the ceiling is only a foot high in places. The passage characteristics contrasted sharply with those of the previous, active stream passageways. Looking ahead, we expected the cave to soon end in a siphon, but much to our excitement the passage changed back to its former self and even enlarged. Surveying as we went, we passed through two rooms, one with two 50 foot high domes. Ahead we could hear the roar of a large waterfall. As we approached, the passage narrowed and we chimneyed high to avoid deep pools below. The water cascaded over a 21 foot drop into another deep pool; the "ceilingless", circular room in which it was contained amplified the falling water. Peering down through the mist, we saw that the passage turned sharply to the right and dropped again. In the meantime, Tommy had discovered a 5 foot wide ledge up on the right wall which overlooked the second drop. This proved to be an excellent rigging point free from the waterfall. I rappelled down, swinging to one side to avoid the water in the bottom of the fissure passage. We surveyed the drop from the ledge to the water and found it to be 71 feet. From here I climbed down another short drop and arrived at the top of quite a deep pit. The water had scoured clean the passage but on the wall I found a solution pocket that contained several fist-size rocks. Although I never was exactly sure how long it took a rock to fall (the waterfall was very loud) I estimated the depth to be about 150 feet \pm 50 feet. With no more rope or time we headed out of the cave, shouldering the burden of the heavy, wet ropes. The bottom of the 71 foot drop was surveyed to be -920 feet below the entrance with a total horizontal passage length of 2287 feet to this point. A strong current of air was noted blowing into the cave and throughout the cave small side channels join the main stream. This all points to a very promising cave system, that has a potential depth of about 3500 feet.

Bill Russell again hiked around this day. He examined the north end of the San Miguel Dolina as well as the valley to the northeast along the road as far east as La Providencia. The day was very foggy and all that was found were numerous filled sinks.

30 December The morning was spent surveying Cueva de San Agustín, as far as the deep pool of water. (See cave description in AMCS Newsletter, v. II, no. 3, p. 64. Also see photograph on page 158.) Early in the afternoon we packed our equipment and began the trip to Austin, arriving 31 December.

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- Persons: Charles Borland III, T.R. Evans, Ranald Stearns
 - Date: 25 December 1966 - 2 January 1967
 - Destination: Aquismón, S.L.P. area
 - Reported by: T.R. Evans Ft. Detrick, Maryland

An area west of Aquismón, S.L.P. shown on a Mexican topographic map contains many large dolinas and sinks occurring between 750 m and 1000 m above sea level (The elevation of Aquismón is about 100 m.) and indicates a few as high as 2000 m. We decided

to spend a few days hiking in the area to determine what exists in the way of caves and pits. Since our purpose was to reconnoiter the region, we did not burden ourselves with rope and climbing gear; however, we did take carbide lamps, flashlights, and helmets so we could briefly explore any horizontal caves we happened to find.

Arriving in Aquismón around 5 p.m. on the 26th, we ate supper and started the hike up to a village called Tamapatz — roughly 15 km from Aquismón and 650 m higher. By 7 p.m. we were plodding along in the moonlight and quite tired, so decided to camp. At this point we were already in Tlamaya-like karst. Continuing on the next morning, we arrived at a place called La Laja where there is a small store where one can buy various refrescos and fruit. We were told of several caves which exist in the area, but visited none.

At La Laja the trail forks — the one to the left going to Tamapatz and the one to the right to a ranch and other trails which led to Tansosob, Rancho Nuevo, and eventually to Tamapatz, too. A house is located at this junction and the owner informed us of several caves and pits in that area. He described one large cave off to the left of the trail leading to the ranch, and we decided to have a go at finding it. The gentleman was unable to go with us because he had injured his ankle. Leaving our packs at his house, we set off. It was evident from the beginning that we had little hope of finding the cave, and finally we came across some lads clearing brush from under the coffee trees. Yes, they knew of caves and would show us some — and took us to a couple of small shelter caves. What about sótanos? Sure, there was a big one on down the trail off to the right...only a half-hour's walk away. Being truly desperate to find something other than shelter caves (Got to keep up the image, you know.) we bombed off to find the pit — again with no guide as the youths had to remain working.

Carrying on up the trail, we eventually arrived at another house and stopped to inquire if anyone there knew of the pit. Oh yes. Half-hour's walk away...really big and very 'profundo'...and birds, too — lots and lots of birds, especially in the morning and in the evening. Called the Sótano de las Golondrinas. A guide was provided, and filled with enthusiasm we departed. A half-hour later we were dripping with sweat and on the verge of exhaustion. We had to stop and rest (we the gringos, that is). Stopping and resting while walking is apparently a yankee habit that the locals don't practice. From then on, it was will power that forced us onward and upward until we finally reached the sótano.

A wooden gate is encountered on the right side of the trail and from here, a trail leads past a hut to a milpa and the pit. The pit is on the side of a hill and one walks up to it. No water appears to drain from the surface into the pit, which is 150 to 200 feet across. On the side of the sótano opposite the trail the walls are about 100 feet higher. This pit is deceptively large and when we first looked down, all we could see was the opposite wall until we got close enough to lean over the edge and have a better look...and then we could see nothing but inky black. The pit is completely overhung at the point the trail intersects it, although it might be possible to rig it so the rope would be near a wall for a good part of the way.

After awhile, the vague form of a bottom could be seen, and

it looked a good 300 feet deep. Now it was time for that special event most pit cavers enjoy - rock dropping. The hectic search for rocks was on and none could be found near the edge of the pit. Finally some were found 50 feet away or so and a watch was made ready. Leaning over the edge, I dropped the first rock which was 6 to 8 in. in diameter. Down it went. In 5 or 6 seconds the great crashing sound would be heard...not a sound. Eight seconds, 9 seconds - nothing. Finally after 9 1/2 to 10 seconds the roar of the rock falling through the air could be heard and after 10 1/2 to 11 seconds the sound of the rock hitting bottom was heard. Some pits "look" deep and others don't. This one just didn't look 10 1/2 seconds deep, and naturally we dropped another rock. Same story. The rocks were all about the same size and they could be seen for about 8 1/2 seconds after which there was not sufficient light, although as I said, the vague form of a bottom could be seen. And, it took between 10 1/2 and 11 seconds for the sound of the rocks hitting bottom to be heard after the rocks were dropped. Convinced the pit was pretty deep, we headed back down the trail to our packs. Even though there appears to be no surface drainage into the pit, it should prove interesting upon further investigation.

At the guide's house, we stopped for water and were also given some coffee to drink. We thanked the people for their kindness and set out for the junction and our packs. By now it was 3 p.m. The chap at the junction told us that Tamapatz was only an hour or so away. 4 p.m., 5 p.m., 6 p.m... still struggling along. We arrived at a cave within a few feet of the trail (on the left when going towards Tamapatz) and briefly checked it. From the walk-in entrance a passage 15 feet wide and about as high takes off. I followed it a couple of hundred feet before returning to the entrance. It was starting to get dark by this time and we were anxious to reach Tamapatz. Finally around 8 p.m. we arrived...a Huastecan hour's journey but a gringo's 4 or 5.

One of the small stores was still open and we went in for a refresco and a little beer. The owner offered to let us sleep in an adjoining room which contained his bed and among other things two full-sized pool tables in a very dilapidated state and no longer in use - save by the odd spelunker or two that wander through...and upon occasion by the owner. He insisted that one of us sleep in his bed and that he would take one of the pool tables while the other two of us could sleep on the remaining pool table. Being very tired, we sacked out at 9 p.m. and all was quiet until around 5 a.m. People here evidently like pork and consequently pigs are butchered...at 5 a.m...immediately outside the store. It is amazing what the squeals of a dying pig can do to a person at 5 a.m.

We spent the 28th hiking in the hills west (roughly) of Tamapatz. Several trails lead to the hills. I might add that the topo map we had (1:100,000) was not sufficiently detailed to do us much good in our hiking. We spent a couple of hours going up a trail, checking dolinas and finding nothing. The surface at the higher elevations (not much in excess of 1200 m and still below the pine trees) was capped with a sandstone or quartzite. Immediately below this was a dolomitic type of rock, the result being a series of springs but no caves. The extent of this cap was not determined and may well be quite limited.

On the way down, we checked several more dolinas and found a reasonably large shelter cave in one. Continuing down, we stopped at a house and were told the location of a pit and found it. It is about 20 feet in diameter and 6 seconds deep. There is no surface drainage into this pit either. We were unable to see the bottom as the entrance was too small to let in much light. From here we took a small trail towards Tamapatz which went through an area we had not visited. While crossing a dolina, we asked a local if there was a cave in the cliff we could see across on the side of the dolina. He said there wasn't much there, just a place where water goes under. We continued on the trail to Tamapatz and came to a small stream while still in the same dolina. It is axiomatic that running streams in dolinas be followed so we set off. Farther down the trail another small stream merged with the first so the stream was now several feet wide and 6 to 8 in. deep. Although the stream bed continues to the cave, it is dry, or at least it was when we were there. The water sinks in gravel and rock several hundred yards before the cave. It is evident that during the wet season, water does run into the entrance. The stream bed is only 4 feet wide and around 1 foot deep.

Oh yes. There is a cave. The entrance, located at the base of the cliff, is 8 feet high and 10 to 15 feet high. A short 8 to 10 foot climb brings one to the entrance room which is 40 feet wide and about 10 feet high and 50 feet long, and on a slant of about 60 degrees. The rock is all polished and very slick, and no decent hand holds are present. A passage definitely continues at the bottom and rope will be necessary to get there. The water which sank in the gravel upstream was not in evidence in this part of the cave. Of all we found on the trip, I feel this cave is the most promising, primarily because an active stream enters it. This is usually an excellent sign. The vertical potential for this cave is about 500 m. From this cave we went directly to Tamapatz.

The following morning we decided to take a trail which reportedly leads to Huichihuayán. It was a fine trail for about a mile and then there were many trails, all just alike, and going in many different directions. We had a compass so followed anything that went east or southeast. Few houses were encountered, so we could not ask for caves. We passed a couple of caves right on one of the trails. The first was at the end of a large sink which was 50 feet long and about 30 feet wide. The sink intersected a room about $1/3$ of the way up from the floor. The room was quite high, 75 feet or so and about 35 feet in diameter, with no leads from the room that could be found.

The second cave we found was a small pit about 3 feet in diameter and 40 feet deep, maybe a little deeper. Hiking on, we kept descending into dolina after dolina, each with one or two houses in the bottom. The men were working in the fields and the women and children who remained at the houses did not speak Spanish and were not a little frightened at us. There must be caves and pits in much of the area we walked through on the way down to the Inter-American Highway, but being unable to find anyone to show us them, we found nothing. Local guides (free or paid) are usually very worthwhile.

After many dolinas and much walking, we found ourselves overlooking the highway. It did not look terribly far away, but it

was. Almost 2 hours were required to walk down from the over-look to the valley below — a very steep and tiring descent. We came out on the highway about 7 km from Huichihuayán (north). A succession of bus rides lasting until the wee hours of the next morning, the 30th, got us to Monterrey. Here we got a hotel room and sacked out until 10 a.m. and then went to find a bus to a mine called San Pedro, San Pablo, or something like that. By the time we did locate the right bus station it was too late in the day to go to the mine, so we caught a bus to Laredo.

Thus we make it back to the Estados Unidos. On the trip we briefly checked the area between Aquismón—Tamapatz—and the Inter-American Highway 7 km north of Huichihuayán. We found several caves and pits in the region but found no great concentration of them such as is found around Xilitla, Tlamaya, Tequila, or Huautla. Another trip to the area to check what we did find and to look for more should be worthwhile.

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 NOTES FOR PHOTOGRAPHERS IN MEXICO

by J. H. SCHERMERHORN

Harrison, Arkansas

Those who plan to take cameras into Mexico should do some advance planning. First, it is best to bring all the film and supplies you will need with you from the States. Film which you may be accustomed to using may be difficult to find. When you do find it, it will cost more and the instruction sheet will be in Spanish, French, German, and English. If color film has been kept or stored in places of high temperature, the colors will probably be distorted.

Loss of equipment by theft is very likely if you are around large towns. I have heard of several camera owners having cameras stolen in Mexico City. Most of these cameras were in the front of the car, which is very easy to break into. It is best, if you leave your car unattended, to put any valuable items out of sight in the trunk. If you have expensive equipment, it is well worth it to have it insured by a sound U.S. insurance company. An "all risk" policy costs about \$4.50 per \$100 of equipment per year. With this policy you are also covered if you drop a piece of equipment into a deep pool of water, into a sótano, etc. If you file a theft claim with your insurance company, you must supply a statement of "proof of loss" (an official, certified police report), and this can be a time-consuming and difficult item to obtain.

Perhaps others will benefit if I relate my experiences in Mexico City on 27 December 1966. We were staying at a middle-class hotel which had a garage in the basement that was locked each night. However, on this night we had been out taking photos of the spectacular holiday decorations and when we returned the hotel parking lot was full to capacity. Even the driveway was full and it would not hold another car. So, the car was parked in a very well-lit area directly in front of the hotel; and the most valuable equipment was taken into the hotel room. The next morning I found the door ajar and several photographic accessories, film, and a hard hat with carbide lamp missing. The thieves were not just ordinary, common street thieves. They left many items and took only the photographic items (except for the helmet and

lamp - they must have been an unusual curiosity). They even sorted out the unexposed film from the exposed film and left the latter. As the police said, it must have been a specialized ring who was tipped off about our location.

What should I do now? The clerk at the hotel desk said to call the American Embassy. The Embassy said to contact the nearest municipal police precinct (Delegación). This I did and made a complete report. But getting an official copy of this report turned out to be the real kicker. It was in the middle of the holidays and offices were closed and the Embassy only made things more confusing instead of helping. Not knowing whether I would get the papers in a few days or a few weeks, I finally got in contact with an attorney in the Oficina Legal de Auxilio Turístico who signed a statement saying that he would send me a certified copy of the police report for 24 pesos within 30 days. I received the papers in about 45 days - they went the long way, being sent along with someone's pickpocket claim to Seattle, Washington. Luckily that person was kind enough to notice my address on the papers and send them to me.

From the above experience, I have compiled a list of facts to consider when staying in Mexico City:

- 1) Never leave an unattended car on the streets at night. If you leave a coil of climbing rope or anything of value on the front or back seat, chances are that it would be stolen before morning. Take all precautions to avoid anything from being stolen - keep valuables out of sight and put all your caving gear and other items you won't need in the trunk before you get into Mexico City.
- 2) If you have anything stolen and must get a copy of a police report for your insurance company at home, go to the Secret Service Police first. They are at Jefatura de Policía del Distrito Federal (Police Headquarters) at 20 de Noviembre and Fray Servando on the second floor in an office labeled, "Servicio Secreto". I hear that they can get you a certified copy of the report in a few hours, when it may take days or weeks to get one through the Procuraduría del Distrito, or the municipal police. By all means, don't go to one of the fellows in the brown uniforms; they are the Tránsito, or traffic police. All of these three police forces work separately and there is little cooperation between them.
- 3) All of the police and everyone else I talked to said that there is very little chance of recovery in such thefts.
- 4) Any traveler with clothing or equipment of any type in plain view in the front of his car is just as apt to have a theft in the United States as in Mexico; it is just harder to obtain a copy of the police report in Mexico.

When out in the country and camping near your car, the chances of having something stolen are very slim. However, when in large cities, it is a different matter and be sure to take extra precautions to avoid any chance of a theft.

RECENT ADDITIONS TO THE KNOWLEDGE OF CAVE DISTRIBUTION IN MEXICO*

by WILLIAM H. RUSSELL and TERRY W. RAINES

Austin, Texas

During the last four years a large amount of new information on Mexican cave distribution has been compiled by the Association for Mexican Cave Studies. The AMCS was founded in 1962 by T. R. Evans as the Speleological Survey of Mexico, and was composed initially of a small group of University of Texas students engaged in collecting information on Mexican caves and karst. Interest in Mexico had been initiated by the Texas Region project at La Gruta del Palmito (also called La Gruta de Bustamante) and by the trips of Robert Mitchell and others to the spectacular mountain karst surrounding the town of Xilitla in the eastern part of the state of San Luis Potosí. Early interest centered in four areas: the relatively accessible area north of Monterrey, the Sierra de El Abra north of Cd. Valles, S.L.P., the Xilitla mountain karst, and the mountainous area just south of the city of Orizaba, Ver. From these areas interest has expanded, and in 1966 AMCS members visited the entire country with the exception of the far west coast, Chiapas, and Yucatán. In 1964 the name Association for Mexican Cave Studies was adopted and at the same time the Association has attempted to broaden its membership. This effort has been successful and by the end of 1965 membership had increased to over 100, located throughout the United States. This increase has enabled the Association to publish a Newsletter and a Bulletin to keep members informed of current explorations and to acquaint others with the knowledge gained. Exploration has so far been concentrated in the limestone mountains extending from south of Texas into northern Oaxaca. Rainfall in these mountains varies from less than 10 in. to over 100 in. per year, and the local relief from gentle plains to some of the most spectacular mountains in North America. At the present rate of progress, fairly detailed knowledge of the cave distribution in these mountains will be obtained within a few years. This survey should provide much information on the relation between speleogenesis, relief, rainfall, and temperature.

Even though the area north of Monterrey, N.L. has been rather well studied, there is still much work to be done. This is an arid region with jagged limestone ranges rising abruptly above plains developed on valley fill and less resistant rock. Mapping has been completed at Gruta de Carrizal, located about 85 miles north of Monterrey. The cave is developed in steeply dipping limestone surrounding an intrusive volcanic mountain. Of note is the interesting speleogenesis. The passages are aligned along both the strike and dip as well as two well-developed levels and two streams, one 88 degrees F and the other 77.5 degrees F. The map of La Gruta

*A somewhat briefer form of this paper was presented at a session on cave geography at the American Association for the Advancement of Science meeting in Washington, D.C., December 1966, and was co-sponsored by the National Speleological Society, AAAS Section E-Geology and Geography, and the Geological Society of America.

del Palmito, one of the larger and more impressive North American caves, is undergoing revision, and soon a revised plan and profile of this cavern will be available. This cave, about 65 miles north of Monterrey, is essentially two large rooms and reaches a depth of 667 feet. The map of the commercially developed Grutas de Villa de García near Monterrey has been completed. Recent work has located several caves encountered in the Golondrinas Mines, and several more caves have been visited in Huasteca and other canyons just west of Monterrey. The caves in the area north of Monterrey represent a variety of types. Gruta del Palmito and García greatly predate the existing topography and are deep phreatic caves developed in favorable reef areas probably during a more humid climate of the late Tertiary. Only a few remnants of the probably much greater number of shallow phreatic caves have been preserved in this area of high relief and rapid erosion. Some of the caves such as Grutas de San Bartolo in Cañón de la Huasteca have a complex history of invasion and deposition of clastic fill.

To the south between Monterrey and Cd. Victoria, Tamps. lie the limestone ranges of the Sierra Madre Oriental with peaks extending to over 12,000 feet. Exploration of this rugged area has only begun. A few caves have been visited in the El Diente area just south of Monterrey and some small caves have been examined west of Montemorelos and Hidalgo. The largest cave yet located in the area is Cueva de La Boca, also called Gruta de Santiago, located just southeast of Monterrey. This is another deep phreatic cavern, and is essentially one large passage in places over 400 feet high. In this area south of Monterrey the limestone is of very great thickness and doubtlessly will contain additional large caves, but the rugged terrain makes access difficult.

South of Cd. Victoria the higher ranges receive larger amounts of rain and there has been considerable karst development. In the Sierra de Guatemala southwest of Cd. Victoria a karst has developed characterized by numerous deep pits and almost impenetrable areas of vegetation-covered karst pinnacles. No large horizontal cave systems have yet been found in this area but some will probably be encountered, both in the exploration of the deeper vertical systems and in other parts of the range yet to be investigated. The deepest system explored in this area is the Sótano de la Joya de Salas, located about 45 miles southwest of Cd. Victoria, just west of the crest of the range. This pit is near the bottom of a large closed valley and receives much runoff after infrequent heavy rains. It has been explored to a depth of 896 feet and a recent trip indicates that it might soon be possible to reach a greater depth. Exploration is now blocked by perched water that may be expected to drain. In the same range in the vicinity of Rancho del Cielo northeast of Gómez Farías, 10 pits have been explored in an area of about 4 square miles, the deepest being 400 feet. This appears to be typical of the east face of the range. Several caves west of Gómez Farías composed primarily of single, irregular rooms have been investigated. Evidence of extensive horizontal development at elevations near the present base level is the large horizontal passage in Bee Cave located just above the present water table at a relatively low elevation south of Gómez Farías, and the generally horizontal nature of the caves associated with the nacimientos (resurgences) of the Río Frío and Río Sabinas. The Río Sabinas appears to flow from a large passage not far below the water level, and Cueva del Nacimiento del Río Frío contains a

large horizontal passage about 100 feet above the resurgence of the river. The Sótano de Gómez Farías, a deep system of rooms, passages, and interconnected pits, gives evidence of a complex history. Not enough work has yet been done in the area south of Cd. Victoria to fully clarify the history of cavern development, but it appears that most of this development has been the vadose enlargement of poorly integrated phreatic voids. Due to the heavy rainfall and high relief the eastern face of the range is characterized by the formation of numerous deep pits. Apparently there is a greater amount of horizontal passage near the present base level. This might have been expected from geologic considerations, as the resurgences at the base of the mountains are only a few hundred feet above sea level and probably have remained at their present level since the end of the uplift of the area associated with the Laramide Orogeny. Whether there are other zones of horizontal development or if water entering the limestone far from the resurgences continues downward to almost the level of the resurgence are problems only further exploration can answer.

Extending from the southeast end of the Sierra de Guatemala is a much lower, relatively narrow cuesta-like range, the Sierra de El Abra. This range, about 5 miles wide and 70 miles long, extends from north of Cd. Mante, Tamps. to south of Cd. Valles, and contains the most extensive cavern development so far discovered in eastern Mexico. Several caves exist with an explored length of over one mile, and the longest, Sótano de la Tinaja, contains over two miles of surveyed passage. Exploration has been concentrated in the relatively small Los Sabinos area just north of Cd. Valles where 6 large caves are known in an area of less than 10 square miles. The southmost cave of this area is Sótano de Montecillos. The cave is located at the end of a normally dry arroyo, and is entered by a vertical drop of 45 feet. At the bottom of this drop the largest horizontal passage leads 150 feet to a 140 foot drop into a large passage. Only about 300 feet of this passage have been explored, as exploration was halted by deep pools. Another pit approximately 1200 feet up the arroyo from Sótano de Montecillos has been named Sotanito de Montecillos. This pit drops 110 feet into a series of horizontal passages averaging about 15 feet in diameter. Over 2000 feet have been explored with no end in sight. About a mile north from the Sotanito is located Sótano de la Tinaja. A normally dry arroyo also enters this cave, the slope being more gradual, and no equipment is necessary. Exploration in this cave is more advanced than in any of the others in the area, with over 2 miles of passage surveyed. Most of this cave is composed of large horizontal passages, one of which appears to have reached the water table 445 feet below the cave entrance, which is about the same level as the nearest resurgence. Other passages end in fill or perched siphons, but the cave is not yet completely explored. On to the north of Sótano de la Tinaja is Sótano del Arroyo, with over one mile of surveyed passage. An arroyo also enters this cave, the flood water following the main passage down a series of small drops for about $3/4$ mile. Here exploration has ended at a short drop into a pool, with the passage apparently continuing beyond. About $1\ 1/2$ miles north of Sótano del Arroyo is Sótano del Tigre, also located at the end of a large arroyo. A series of drops descends 300 feet to a short passage that leads to another drop which has not been descended. Just east of this cave is Cueva de Los Sabinos, the only large cave in the area that does not receive flood water. This cave appears to be an essentially

unaltered shallow phreatic passage about 1/2 mile long. It seems likely that when the Los Sabinos area is completely explored there will be over a mile of large passage for every square mile of surface. Whether this ratio is typical of the Sierra de El Abra as a whole or if this is an exceptionally favorable area is not known. It is possible that the former is true, as there are numerous other promising and as yet unvisited entrances in all parts of the range. Sótano de Venadito, located at the end of an arroyo just north of the San Luis Potosí state border, has been partially explored, with other larger sótanos reported in the vicinity. Northeast of Cd. Valles the entrance to Ventana Jabalí opens onto the steep east face of the range. This cave is essentially one large passage 1200 feet long. About 400 feet from the entrance a dome rises 503 feet to intersect the flat surface of the range, forming a skylight and the deepest free drop in North America. This dome does not appear to be primarily of vadose origin, since, except at the very top, it is quite large and is spanned by a natural arch about halfway down. A somewhat similar cave is located in the El Abra pass just above the Inter-American Highway south of Cd. Mante. This cave, Cueva de El Abra, consists of an entrance passage 60 feet wide, 70 feet high, and 500 feet long leading to a shaft that extends upward to the surface and downward to the lower level of the cave, a large parallel fissure. Most of the caves in the Sierra de El Abra appear to be essentially unaltered shallow phreatic passages. Even caves that receive large amounts of water are little modified, indicating that invasion by surface waters is a relatively recent event. The well-known Grutas de Quintero, located near the town of Quintero just south of Cd. Mante, appears to be an abandoned resurgence. Lowering of the water table and continued solution has drained this channel. There is no integrated surface drainage developed on the Sierra de El Abra; water falling on the relatively flat surface of the range sinks into the permeable limestone to reappear at resurgences along the base of the east face of the range. The largest of these resurgences are the Nacimiento del Río Mante just west of Cd. Mante and the Nacimiento del Río Choy east of Cd. Valles. The limestone exposed in the Sierra de El Abra appears to be especially favorable for the formation of caverns. This limestone, partly composed of reef material, has never been deeply buried and it is possible that it has retained some of its original porosity.

A few miles from the southern end of the Sierra de El Abra rise high limestone mountains that contain some of the most spectacular karst in Mexico. These mountains extend from just north of the Río Tamuín, passing west of the town of Aquismón, to south of Xilitla. This is an area of several hundred square miles completely devoid of surface drainage except for two rivers. The Río Tamuín flows through a narrow canyon that cuts into the northern part of the karst area and the Río Moctezuma has cut an even deeper canyon in the south. In this area limestone reef masses over 6000 feet thick have been folded into mountains whose peaks rise over 9000 feet above the resurgences at the valley level. These ranges rise sharply above the coastal plain and consequently receive large amounts of precipitation, with Xilitla receiving over 100 in. per year. Only a small part of this area has been investigated, as efforts here have so far been limited to small areas along the few roads. Near the town of Tlamaya, northeast of Xilitla, an area of about 3 square miles has been closely examined. This area is 1800 feet above the resurgence of the Río Huichihuayán and contains

Sótano de Huitzmolotitla, with an entrance pit measuring 150 feet in diameter and 364 feet deep. Also located in the area is Sótano de Tlamaya, the deepest explored cave in North America. In both these caves a series of vertical pits leads to nearly horizontal fissures with a small stream flowing along the floor. Sótano de Huitzmolotitla has been explored for 10,000 feet to a terminal siphon 804 feet below the entrance. Sótano de Tlamaya has a depth of 1488 feet and a length of 4000 feet. These caves are about one mile apart and come within a few hundred feet of each other, but the horizontal levels do not appear to be related. Five other vertical shafts are known in the area, and several caves with vertical pits have been explored, making an explored total of 15,000 feet of passage and 3000 feet of vertical pits. This ratio is perhaps typical of the east face of this range. Several caves consisting of large rooms have been mapped along the road extending across the mountains at Xilitla. The most notable are Cueva del Salitre, just east of Xilitla, and Cueva de la Selva, west of Xilitla. This road also passes several pits, the deepest being Sótano de San Antonio, 386 feet; Sótano del Pozo, 502 feet; and Sótano de las Hoyas, 319 feet. The higher areas northwest of Xilitla have not yet been visited except for a brief reconnaissance of Cerro Miramar, overlooking Xilitla. This mountain has pits to within 300 feet of the top. This high area is very promising and probably contains numerous deep systems. The sinkhole-pitted highlands west of Aquismón also need to be investigated. The Xilitla karst might be considered to extend south across the deep canyons of the Río Moctezuma and the Río Amajac, but there the geology becomes more complex: south of the Moctezuma there is intense crumpling, and south of the Amajac are large areas of volcanics in the Transverse Volcanic Belt. Though much of this southern area has been crumpled and dissected, there is great local relief and the area has much promise.

South of the Xilitla karst, Tertiary volcanic rock has covered large areas, forming a belt of igneous rock that extends across the continent from Tepic, Nay. on the west coast to Veracruz, Ver. on the east coast. This area has few exposures of limestone, though two large windows of limestone exist. One lies near the east end of the belt and west of the town of Jalapa, Ver. Although it is unchecked, the area is promising and contains a well-developed karst in certain parts. The other large exposure of limestone lies mainly in the state of Guerrero, in a wide band west of the town of Cuernavaca. This area at one time also had a well-developed karst, but it was buried by Tertiary volcanics and is only now being exposed by erosion. Most of the known caverns are remnants of large caves that developed before the area was buried, and have only recently been exposed. Some of the largest caves in Mexico are located in this area, but much more work is needed to even complete a rough survey of the area. Of international fame is the large Grutas de Cacahuamilpa, a well-decorated phreatic passage one mile long and averaging more than 100 feet in diameter. Beneath this cave are the two large stream passages of the Dos Bocas system, draining large valleys and containing over 5 km of large passage. Nearby is Gruta de Mogote and Cueva de la Estrella. Just south of Cacahuamilpa is Gruta de Acuitlapán, rumored to be the largest cave in Mexico. Southeast of Chilpancingo is Gruta de Juxtlahuaca, with at least 2 miles of large passage. This area contains relatively few pits, the deepest being Pozo Meléndez (also called Boca del Diablo) 320 feet deep. Little systematic work has been done in

this area, but the uncovering and rejuvenation of the ancient karst terrain is a process that warrants further study.

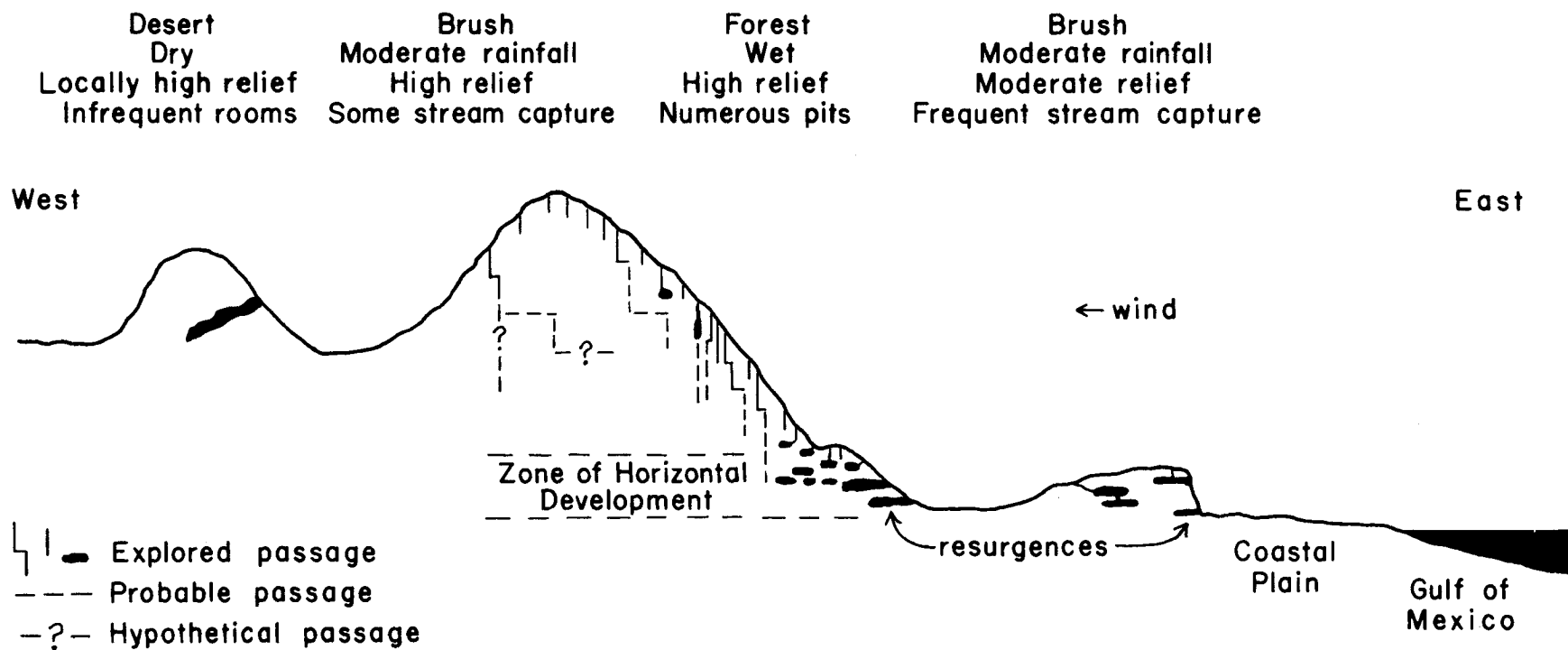
In southern Veracruz near the town of Orizaba several large resurgences have been investigated, the largest being Ojo de Agua Grande. South of Orizaba near the town of Tequila a small area has been intensively investigated. The town lies in a deep narrow karst valley. Several short streams flow from springs and sink into caves and pits along the valley floor. A large number of pits has been located, the deepest being Sótano de El Crucero, 364 feet deep. Sótano de Oztoatlicholoa reaches a depth of 700 feet in a series of drops. Both these caves have narrow stream passages at the bottom. Well-developed karst forms a wide belt from near Orizaba and continues southward through Tequila into the Huautla area in northern Oaxaca. Here there are karst highlands over one mile above the Río Santo Domingo. In one place a slope descends over 6000 feet into the river with an average angle of greater than 45 degrees. Little work has been done in these highlands but preliminary investigation has found two large caves just east of Huautla where water from the western mountains flows into pits at the edge of the limestone outcrop. The largest is the Río Iglesia, flowing through a valley that ends against the west edge of the outcrop. The river enters a large, unexplored cave system. Other similar caves exist in the vicinity, with Sótano de San Agustín dropping 250 feet into a steeply sloping passage carrying large amounts of water. It is likely that investigation into this area will reveal large and deep cave systems.

Several large karst areas are as yet unvisited by members of the AMCS, including the well-developed karst of Chiapas, Tabasco, and Yucatán. Yucatán has been covered by others, but both Chiapas and Tabasco have large areas of promising unexplored karst. Along with the geological investigation of the caves, a biological investigation is being conducted. James Reddell, presently at the University of Kentucky, is coordinating this work. From collections obtained in several hundred Mexican caves, a picture of the distribution of cave-inhabiting animals is emerging. In this investigation, many new genera and species have been discovered, as well as numerous range extensions. The wide range of climate and relief present in Mexico make it possible to isolate the effect of the various factors that influence speleogenesis. Several slides will be shown illustrating this variety of climate and terrain. Then, a tentative outline of the effect of these factors on speleogenesis will be presented. (See next two pages.)

CHARACTERISTICS OF SELECTED MEXICAN KARST AREAS

Area	Rainfall, Temperature and Vegetation	Relief and Erosion	Karst Features
North of Monterrey	10-20 in/yr, summer showers average temp 68°F desert scrub, oak in mts.	5000 ft, narrow ranges rapid mechanical erosion	Little surface expression, some etching and karren in mts, no closed depressions, infrequent caves usually unmodified deep phreatic rooms, springs at base of range.
South of Monterrey	10-40 in/yr, summer showers average temp 60°F-68°F woods in mts.	10,000 ft, massive ranges rapid mechanical erosion	Little modification of surface, no closed depressions except in gypsum areas, karren in mts, infrequent deep phreatic caves, area of well-scattered springs.
Sierra de Guatemala	30-80 in/yr, well-distributed from June to Sept. average temp 64°F-68°F forest in mts.	6000 ft, massive range rapid chemical erosion	Some surface modification with a few closed depressions, numerous sinks, well-developed karren and karst pinnacles in higher areas, caves mostly vadose with shallow phreatic development at lower levels, resurgences at base of range.
Sierra de El Abra	35 in/yr, showers June-Sept average temp 70°F brush	1000 ft, cuesta moderate chemical erosion	Some surface modification with a few shallow depressions, karren common, frequent disappearance of arroyos, numerous caves mostly large horizontal shallow phreatic passages, resurgences at base of range.
Xilitla	30-100 in/yr, well-distributed from June to Sept. average temp 63°F to 70°F dense forest	7000 ft, massive range rapid chemical erosion	Much surface modification; numerous sinkholes, uvalas, pits, haystack hills, caves; karren and karst pinnacles; caves mostly vadose except at lower levels; resurgences at base of range.
Guerrero	25 in/yr, showers June-Aug. average temp 68°F brush	2000 ft (1000 ft in limestone) mechanical erosion	Buried karst terrain being uncovered and rejuvenated, much surface modification, large blind valleys and sinkholes, few pits or small depressions, caves formed during previous karst cycle.
Huautla	50-90 in/yr, well-distributed from June to Aug. average temp 65°F to 70°F	8000 ft, massive range rapid chemical erosion	Extreme surface modification, blind valleys, dry valleys, sinks, pits, karren and karst pinnacles, runoff from impervious rocks to west, resurgences at base of range.

GENERALIZED RELATION BETWEEN
VEGETATION, RAINFALL, TOPOGRAPHY, AND SPELEOGENESIS
of the
SIERRA MADRE ORIENTAL, NORTHEASTERN MEXICO



BIOLOGY SECTION

MEXICAN CAVE BEETLES OF THE FAMILY CARABIDAE

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Carabids, or "ground beetles", are prevalent in many caves in all regions of the earth, but the cavernicolous species are but a small fraction of the approximately 20,000 known species. These beetles are for the most part predaceous, feeding on other small invertebrates, and are consequently beneficial or at least not harmful from an agricultural or medical standpoint. A few eat seeds and may be minor pests. The food is picked up in the mandibles, rotated by the palps, crushed or at least softened by the repeated working of the mandibles, and partially digested outside the body by enzymes poured out from the buccal cavity onto the food. All available evidence indicates that cave carabids feed on other small cave animals, but they will certainly eat recently killed cave crickets, millipedes, or fragments of fish or beef.

The cave carabids include troglobites (cave obligate species), troglophiles (species which can live either inside or outside of caves), threshold trogloxenes (species found in the twilight zone and dependent on food in the vicinity of the entrance, including food obtained outside the cave during night forages), and accidentals (species washed or straying into caves). The first 3 groups are of greatest biological interest; the accidentals can usually be collected in greater abundance outside caves.

Troglobites

Troglobitic carabids fall into two large groups, the tribes Trechini and Agonini, with a residuum of species belonging to other tribes which have few troglobitic representatives. The trechines are widely distributed throughout the world. With the exception of two or three tropical and subtropical genera, they occur in cool, moist, forested environments. The tribe is relatively well known, thanks to the comprehensive, 1800-page Monographie des Trechinae, by Dr. René Jeannel, published 1926-1930 in the entomological journal L'Abeille. Numerous genera and species of troglobitic trechines are found in the caves of southern Europe, from Spain to the Caucasus, in Japan, New Zealand, and in eastern United States. About 40 species of non-troglobitic trechines belonging to the genus Trechus occur in northern and mountainous regions of North America; T. aztec and T. tolucensis inhabit south-central Mexico but have not yet been taken from caves. Beetles of the genus Paratrechus constitute the principal element of the Mexican trechine fauna; these occur in the mountainous regions and are rarely found in caves. However, in 1943 Dr. Candido Bolívar y Pieltain described Mexaphaenops prietoi from La Gruta del Palmito, near Bustamante, N.L., the first troglobitic trechine in North America to be discovered west of the Mississippi River and the first known troglobitic beetle in Mexico (Ciencia, 3: 349-354). This beetle is elongate and slender, reddish-yellow

(depigmented), and has the eyes reduced to tiny, pale spots. About 15 specimens have been collected in 25 years, apparently all of them from or quite near the entrance room of the cave.

Two additional species of Mexaphaenops, not yet described, have been discovered by John Fish in the Sótano de Tejamanil (Qro.) and in a small cave in Valle de los Fantasmos (S.L.P.). The occurrence of all three of these species in caves at relatively high elevations is noteworthy. There is considerable evidence that the troglobitic trechines of Europe and the United States are descendants of boreal forest species which were widespread during periods of glacial advance during the Pleistocene, but were able to survive the warm, dry climate of the interglacials only by retreating into caves where they underwent regressive evolutionary modifications incidental to adaptation to the cave environment. Absence of troglobitic trechines (and troglobites of most other groups which live in humus and moss carpets) from tropical regions is attributed to the "isothermal" climatic conditions of the tropics. In other words, there were no major climatic changes which changed the surface (soil and moss) environment to such an extent that surface members of troglophile species became extinct and the cave populations thus became isolated in caves and developed into troglobites. The climate of Mexico, particularly the northern portions and the higher elevations, was certainly much colder and wetter during glacial maxima than it is today. It will be most surprising if a species of Mexaphaenops turns up outside of a high mountainous region.

In European trechines, Jeannel was able to point to graded series of species which probably illustrate the stages from a surface species (eyes, wings, pigment) to a cave species (troglobite). In the genus Duvalius, particularly, there are species which live under stones in the mountains and have small eyes, often elongate body parts, and reduced pigment. There are even eyeless species which live deep in humus in the mountains and resemble cave species. Bolívar's earlier discovery of Paratrechus sylvaticus, a pale, depigmented species with small eyes, in Morelos and Distrito Federal, seem to provide a "missing link" in the construction of the same sort of graded series between typical Paratrechus and Mexaphaenops prietoi (Anales Esc. Cien. Biol., 2: 111-118, pl. 9, 1941). P. sylvaticus was placed in a new subgenus, Hygroduvalius, but the diagnostic characters which Bolívar cited in 1941 have since been called into question by the description of other Paratrechus spp., and it is now doubtful that P. sylvaticus is distinct enough to warrant subgeneric separation from other Paratrechus. The latest "link" in the series was forged with the discovery of a blind species of Paratrechus, closely related to P. sylvaticus, in the Sótano de Tejamanil (Qro.) by John Fish. In this species, still undescribed, the eyes are very small, pale, and non-functional, but the body parts are not slender and elongate as in Mexaphaenops. It seems likely that Mexaphaenops includes the relicts of a much older invasion of the caves than this newly discovered species of Paratrechus. For the future, the biological exploration of Mexican caves at the higher elevations should prove most interesting, particularly as additional species of troglobitic trechines show up.

The agonine carabids include the genera Rhadine and Mexisphodrus, as well as Agonum, Colpodes, and a few other genera collected in Mexican caves. No troglobitic Rhadine have been found in Mexico. The genus is rather widely distributed in Western North America,

from Canada to Oaxaca, but only 3 species are known east of the Great Plains. Species of Rhadine have a predilection for cool, dark habitats, and they are consequently found in mammal burrows, caves, cellars, and similar places. Some species (including R. euprepes from Mexico) live in forests, under rocks and logs. Only one species group (the subterranea group) contains real troglobites, and these species are restricted to central Texas.

Mexisphodrus, described as a new genus by Barr (Coleopt. Bull., 19: 65-72, 1965), was first discovered in the Sótano del Profesor (Veracruz) by Terry Raines and Bill Bell. Additional species have been taken in a small cave at Jacala (Hidalgo) (Hendrichs and Bolívar, 1966; Ciencia, 25: 7-10, pl. 1); the Sótano de Tlamaya (S.L.P.); and in the Sótano de la Joya de Salas and a small sink-hole at Rancho del Cielo (Tamps.) (Barr, 1966. Psyche, 73: 112-115). M. veraecrucis Barr and M. profundus Barr appear to be incipient troglobites; they are wingless and depigmented and have very small, pale eyes. M. tlamayaensis Barr is a winged species with large eyes, and M. gertschi Hendr. & Bol. is somewhat intermediate, still retaining moderately well-developed eyes and a fairly dark pigmentation. Three undescribed species of the apparent troglobite variety have been recently collected in Querétaro (Sótano de Camposantos, Cueva de las Tablas), San Luis Potosí (Valle de los Fantasmos), and Oaxaca (Sótano de San Agustín).

The special interest in Mexisphodrus derives from the fact that, until 1957, agonines belonging to the group of "true sphodrines" were known only from the Old World, ranging from the Canary Islands across the Mediterranean region into China. In 1957 Straneo (Ciencia, 17: 81-84) describes the Mexican genus Bolivaridius from surface material, suggesting that species of this genus belonged with the true sphodrines, despite lack of certain diagnostic characters found in the European genera but not in the Mexican one. Prosphodrus was described from New Zealand by Britton in 1959 (Proc. Entomol. Soc. London (B), 28: 103-106); P. waltoni is a cave form (dark, with eyes) which, like Bolivaridius, appears to be a primitive sphodrine. The characters and general body form of Mexisphodrus much more clearly suggest relationship to the true sphodrines than do those of Bolivaridius, but both genera are, in effect, "missing links" that make it difficult to draw arbitrary lines of classification and say what is a sphodrine and what is not. Other sphodrines inhabit Gruta del Palmito (N.L.), Cueva de la Boca (N.L.), and Texas caves of the Del Rio region; these may constitute a third genus of North American sphodrines, but their study has not yet been completed.

The collection in November, 1966, of an eyeless, apparently troglobitic carabid of the tribe Scaritini, in the Sótano de la Joya de Salas, by Orion Knox and El Alexander, has added a remarkable new element to the growing troglobitic fauna of Mexico. Scaritines, which include small to medium-sized, narrow-"waisted" beetles which burrow in gravel at the edge of streams, have only 2 known troglobitic species--one in Yugoslavia and one in Italy--both of which are apparently descended from humicolous ancestors and both of which, by evolutionary convergence, superficially resemble cave trechines. The Tamaulipas cave scaritine, about 6.5 mm in length, is very different in appearance, although it, too, is relatively slender and depigmented and without eyes. The best guess that one can make at the present time is that this insect is

most closely related to a subtribe of scaritines (Forcipaterina) known only from South America, Panama, Dominica, Martinique, Assam, Bengal, and Burma. It may thus be a relict of an archaic Mexican beetle fauna which formerly included the forcipaterines, which, according to this hypothesis, were at one time (early Tertiary?) distributed across eastern Asia, across a Bering bridge, and into western North America.

Troglophiles

The most interesting troglomorphic carabids in Mexico are those of the genus Rhadine (see above). Bolívar (1944, Ciencia, 5: 25-28) described the first of these from Gruta del Palmito (N.L.) as Spelaeorhadine arazai, later transferred to Rhadine. Other subspecies of R. arazai are found throughout the Edwards plateau of Texas, known almost exclusively from caves (R. a. howdeni Barr & Lawrence, R. a. babcocki Barr). R. rotgeri Bol. & Hendr. is known from the Gruta de Cuevaillas and the Sótano de Matehuala (Coah.), and R. medellini Bol. & Hendr. from the Cueva Carnicero (S.L.P.) (Bolívar & Hendrichs, 1964. Ciencia, 23: 5-16, pl. 1).

Pachyteles urrutiai Bolívar (1952. Ciencia, 11: 295-296) is a primitive carabid of the tribe Ozaenini which appears to be a troglophile, restricted to caves of the Sierra de El Abra, S.L.P. AMCS members have collected 2 specimens from the Sótano de la Tinaja, and Cueva de los Sabinos is the type locality. Although the species is rather pale there are no obvious adaptations or regressive modifications for cave life.

Agonum bilimeki Bolívar and Hendrichs and Tachys unistriatus (Bilimek) are two fairly common troglophile species of carabids inhabiting the Gruta de Cacahuamilpa and near-by Cueva de la Estrella.

Trogloxenes and Accidentals

Various species of Colpodes, Ardistomis, Clivina, Selenophorus, and Tachys appear from time to time in cave collections from Mexico. Most of them seem to have been taken near entrances or to have been washed underground along streams. The status of a species of Pterostichus (Ithytolus) from caves of the Sierra de El Abra is still uncertain.

INDEX

VOLUME II

1966

INDEX
VOLUME II, 1966

- Abra, Cueva del (Tamps) 5:126; 6:176
 Acuitlapan, Gruta de (Gro) 4:102;
 5:114(loc. map), 115
 Acuña, Cd. 3:70
Aello (Mormoops) megalophylla seni-
cula (Rehn) bat 5:126
 Agonini-tribe of beetle 6:182-183
 Agonum-genera of beetle 6:182-183
Agonum (Platynus) bilimeki beetle
 4:102; 6:185
 Agua, Cueva de (Río Verde-Valles,
 SLP) 4:83
 Agua, Cueva de (Tlamaya, SLP)
 6:154
 Agua Buena No. 1, Cueva de (SLP)
 4:83-84
 Agua Buena No. 2, Cueva de (SLP)
 4:84
 Agua Carlata, Cueva de (Oax) 3:61
 (loc. map), 65, 67(sketch map)
 Aguacate, Cueva de (SLP) 4:82
 Aguila Oro, Cueva del (NL) 4:82
 Aquismón, SLP (& area) 6:163-167
 Ahuacatlán, SLP 2:39(photo of road),
 4:84
 Ahuate Num. 2, Cueva del (SLP) - see
 Poca Ventana, Sótano de
 Albach, Dr. Roger 2:23-24; 3:56-57
 Alexander, Ed 1:3-4; 2:22, 29-33, 48;
 3:57-59; 6:132-137⁺, 156-163
 Alvarez, Ticul 5:125, 126
 American Museum of Natural History
 3:70
 amphibians 1:12
 Animas, Mina (Cueva) de las (Coah)
 1:5-6
 Antonio 4:79
Antrolana lira isopods 3:69
Antrozus pallidus pallidus bat 5:127
Aphonopelma sp. spider 1:14
 aquatic fauna 2:23, 33
 arachnids 1:7; 4:99
Ardistomis-genera of beetle 6:185
 Arroyo, Sótano del (SLP) 3:69, 71;
 6:175
 Arteaga, N.L. 3:53
Artibeus aztecus Anderson bat 4:103;
 5:125
Artibeus cinereus attecus Anderson
 bat 1:12
Artibeus j. jamaicensis (Leach) bat
 5:125, 128
Artibeus lituratus palmarum J.A.
 Allen and Chapman bat 5:124
Artibeus toltecus bat 4:103
 Avina, Clemencia E. 5:126
 Axtell, Ralph W. 5:126

 Baker, Rollin H. 5:126, 126-127
 Balaam Canche Cave (Yuc) 4:99
 Balanced Rock Cave (Tamps) 1:12
Balantiopteryx p. plicata (Peters)
 bat 5:127, 128

 Balsas Depression 5:111
 Barr, Thomas C. 3:69; 4:102;
 6:182-185⁺
 Barranca del Río Batopilas, Chih.
 1:7, 8
 Barrett, Dennis 1:3-4; 4:72
 Bater, H.W. 4:99
 bats 1:7, 12; 2:24; 4:102, 103;
 5:118, 125-128; 6:143, 147
 Batson, Robert 6:148-149
 Bee Cave (Tamps) 2:33; 6:174
 beetles 1:13-14; 2:29; 3:69, 70;
 4:84, 85, 86, 102, 104; 6:139,
 143, 182-185
 Bell, Bill 1:5-8; 3:69; 6:184
Belonuchus sp. nr moquinus beetle
 1:13
Bembidium unistriatum beetle 4:102
 bibliographies 3:69-71(annot. biol.);
 4:102-104(annot. biol.); 5:113
 (geol., Gro & Mor), 125(biol.),
 125-128(annot. biol.)
 Bicking, Lew 4:73-80, 80-81
Biocrypta magnolia Blatchley
 beetle 4:104
 biological collections, regulations
 concerning 2:46-48
 biology, Mexican cave 1:12-15;
 3:69-71; 4:102-104; 5:124-128;
 6:182-185
 blind fish 1:2; 2:25, 26, 29, 33
 Blumenstein, Mark 4:73-80, 80-81
 Boca, Cueva de La (Grutas de San-
 tiago) (NL) 2:22, 24; 4:102;
 6:143, 145(map), 174
 Boca del Diablo (Gro) see-Pozo
 Melendez
 Bocacito, Boca del (Gro) 5:115
 Bolívar y Pieltain, C. 3:70; 4:99,
 102; 5:124; 6:182, 183
 bones, Pleistocene 4:88
 Bonet, Dr. F. 2:40; 5:124
 Borland III, Charles 6:163-167
 Bowman, Thomas E. 3:69
 Bradshaw, Gordon van 5:127
 Bretz, J. Harlen 5:117, 121
 Bridgemon, Ron 6:149-154⁺
 Broadus, Jerry 6:140-143
 Burnett, Robert ("Rooney") 1:3-4⁺;
 2:22, 37-43, 48; 3:57-59; 4:73-
 80, 81
 Bustamante, N.L. 5:108
 Byers, Reva 2:33; 6:139-140

 Cacahuamilpa, Grutas de (Gro) 4:99,
 102; 5:114(loc. map), 115, 116
 (photo); 6:177, 185
Cambala millipedes 5:124
Cambalidae millipedes 3:70
 Camino, Sótano del (Oax) 6:159,
 160(map)
 Camposantos, Cueva de (Sótano de)
 (Qro) 4:86; 6:184

- Cantabroniscus primitivus isopod
4:104
- Carabidae beetle 3:69; 6:182-185
- Carbón, Cueva del (Ver) 3:71
- Carlos Pacheco, Cueva de (Gro)
5:114 (loc. map), 117
- Carney, Chip 1:3-4; 2:26-29⁺, 37
- Carnicería, Cueva de (SLP) 4:82
- Carnicero, Cueva (SLP) 4:102; 6:185
- Carrizal, Cueva de (NL) 3:53-54;
6:173
- Carter, Dilford C. 4:103; 5:117,
118, 127
- Carter, Gina 2:33, 36 (See also
Duke, Gina)
- Casa Blanca, Cueva de (NL) 4:82
- Causey, Nell B. 3:69, 70; 5:124-125⁺
- caves, unnamed (The following are
the place names of the areas where
these caves are located. For all
other caves, pits, etc. see pro-
per name.)
- Acahuizotla, Gro. 5:117
- Acapulco, Gro. 5:127-128
- Agua Buena, S.L.P. 4:84
- Almolonga, Gro. 5:117
- Arroyo Seco (east of Xilitla)
S.L.P. 4:84
- Arteaga, N.L. 3:53
- Cofre de Perote Ver. 5:128
- Cuevacillas (in the Sierra de
Guatemala), Tamps. 3:55-56
- El Diente (a mountain near Mon-
terrey) N.L. 6:140
- Encinal-Julilo, Tamps. 6:132
- Guerrero, state of 5:111-123
- Huajintlán, Mor. 5:118
- Huasteca Cañón N.L. 2:21
- Huautla, Oax. 3:61 (cave loc. map),
62-63
- Iturbide, N.L. 2:23
- Jacala, Hgo. 6:184
- Julilo, Tamps. 6:132
- La Laja-Tamapatz (near Aquismón),
S.L.P. 6:165
- La Mina (near Julilo), Tamps. 6:132
- Madroño, Gro. 4:86
- Mafz, Cd. del, S.L.P. 6:149
- Manzanillo, Col. 5:128
- Mexcala, Gro. 5:117, 118
- Mitla, Oax. 5:128
- Ocozocoautla, Chis. 4:103
- Pinal de Amoles, Gro. 4:85
- Rancho del Cielo (in Sierra de
Guatemala), Tamps. 1:12-15
- Rancho de las Margaritas, San
Vicente, Gro. 5:127
- San Blas, Nay. 5:128
- San Francisco-Valles, S.L.P. 4:83
- San Miguel (near Huautla), Oax.
6:161
- Tamapatz, S.L.P. 6:166
- Tamapatz-La Pimienta, S.L.P. 6:166
- Tepoztlán, Mor. 5:118
- Tlamaya, S.L.P. 4:79, 80; 6:150
- Victoria, Tamps. 5:126
- Y Griega-Xilitla, S.L.P. 2:38
- caves, rumored 1:4-5; 2:23-24
- caving in Mexico-history 6:173
- celestite 2:21
- centipedes 1:14
- Cepeda, Joseph 6:140-143
- Chamberlin, R. V. 4:99; 5:124
- Chapman, Faye 2:34-37
- Chase, Dale 1:1-3
- Chase, Dan 1:1-3
- Chevron, Cueva (Gro) 4:85
- Chiapas (karst in) 6:178
- Chilonycteris parnellii bat 4:103
- Chilonycteris parnellii mexicana
bat 5:127
- Chilonycteris psilotis Dobson
bat 5:127
- Chilonycteris rubiginosa mexicana
Milles bat 5:127
- Chiropterotriton chondrostega
salamander 1:12
- Chiropterotriton magnipes
salamander 4:103
- Chiropterotriton multidentata
salamander 1:12
- Choeronycteris mexicana bat 5:125,
126
- Chordeumida millipedes 5:124
- Chrotopterus auritus bat 4:103
- Chrotopterus auritus auritus bat
4:102
- Chorros de Agua, Cueva de (NL)
2:24
- ciudad-see proper name
- Clark, Larry 6:149-154
- Cleidogonidae millipedes 1:13;
5:124
- Cline, Howard F. 3:68
- Clivina-genera of beetle 6:185
- Club de Exploraciones de México
3:59
- Cockrum, E. Lendell 5:127
- Cole, Gerald A. 4:102
- Coleoptera 3:69
- collection, biological 1:15;
2:46-48
- colopedes-genera of beetle 6:183,
185
- Constantine, Denny G. 4:102; 5:127
- Cordioniscus laevis Rioja isopod
3:69
- Corynorhinus townsendii australis
Handley bat 5:126
- crayfish 2:29; 4:83
- Creel, Chih. 1:7, 8
- crickets 1:6, 14; 3:53, 54; 4:82,
85
- Crucero, Sótano del (Ver) 6:178
- Cryptocellus ricinulid 4:99
- Cryptocellus boneti ricinulid
4:99, 101 (drawing)
- Cryptocellus dorotheae ricinulid
4:99
- Cryptocellus foedus ricinulid 4:99
- Cryptocellus osorioi ricinulid 4:99
- Cryptocellus pearsei ricinulid 4:99
- Cryptocellus spinotibialis
ricinulid 4:99

- Crystal Cave (Tamps) 1:12, 13, 14
Ctenus sp. spider 1:14
 Cualac (Cototolapan), Gruta de (Gro) 5:118
 Cuautla formation 5:112
 Cuatro Ciénegas, Coah. 4:102
 Cuatro Narices, Cueva de (SLP) 4:80
 Cuesta Blanca, Cueva de (NL) 2:25
 Cuetzala, Grutas de (Gro) 5:118
 Cuevacillas, Gruta de (Coah) 4:102; 6:185
 Cuevacillas, Tamps. 3:54-56
 culture (Bustamante, N.L. area) 4:94-95
 Davis, Johathan 2:34-37; 6:137-139
 Davis, Wayne H. 5:127
 Davis, William B. 4:103; 5:118, 127
Desmodus rotundus murinus bat 5:125, 126, 127, 128
 Devil's Throat (Gro) see Pozo Melendez
 Diablo, Cueva del (Chih) 1:7
 Diablo, Cueva del (Gro) 5:119
 Diablo, Cueva del (NL) 4:88, 90(sketch map)
Diphylla ecaudata bat 5:125
Diplopoda 3:69
 diplura 1:14
 Doctor Arroyo, N.L. 3:49-52; 4:82; 6:137
 dolinas 3:57, 59
 Dos Bocas (Gro) 5:119; 6:177
 Dos Lagos, Cueva de (Coah) 3:70; 4:104
 Duck, Bernie 1:4-5
 Duke, Gina 6:139-140 (see also Carter, Gina)
 Duke, Jim 2:33⁺, 36; 6:139-140⁺
Duvalius-genera of beetle 6:183
- Eleodes hispilabris 4:104
Eleutherodactylus augusti frog 1:12
Eleutherodactylus hidalgoensis frog 1:12
 Empalme, Cueva de (Coah) 1:6
Eptesicus brasiliensis bat 4:103
Eptesicus fuscus pallidus Young bat 5:126
Eptesicus gaumeri gaumeri bat 4:103
 Erickson, Don 1:3-4; 2:26-29, 37; 6:132-137
 erosion (in karst areas) 6:180
 Escorpión, Sótano del (SLP) 6:146
 España, Cueva de la-see Guano, Cueva del
 Estrella, Grutas de la (Gro) 4:86, 102; 5:114(loc. map), 119-121, 120(photo) 6:157, 158(photo), 185
Eumops perotis bat 5:127
 Evans, Dan 6:150-151, 155, 156-157
 Evans, T.R. 3:70; 4:105; 6:163-167⁺
- fauna near Bustmante, N.L. 4:93
 Felder, Tom 1:4-5
 Felton, Ross 2:29-33
 fer-de-lance (snake) 4:80
 Ferrocarril, Sótano del (SLP) 2:32
 Finca Guatimoc, Chis. 4:99
- Finch, Richard 6:146-147
 Fish, John 1:3-4, 20; 2:22⁺, 29-33⁺, 48; 3:57-59⁺, 59-67⁺, 71; 4:72, 82-87⁺; 5:106, 111-123⁺, 124; 6:137-139⁺, 146; 6:183
 fissures (Dgo) 5:126
 Fleshman, Hilda 6:148-149
 frogs 1:12-13
 fungi 4:88-89
- Galeana, N.L. 2:23-24; 3:49-52
 Garcés, Dolores 2:24
 García, Grutas de Villa de (NL) 2:22; 3:53; 4:102; 6:174
 Garza, Ernest 2:37-43⁺
 Gato, Gruta del (NL) 2:23
 Gavilan, Pozo de (NL) 3:49-52, 51(map)
 Gay, Carlo E. T. 5:122
 geography (Bustamante, N.L.) 4:93, 94; (Gro & Mor) 5:111
 geology (Gro & Mor) 5:112-113
 Gertsch, W. J. 3:70
 Gilbert, Lawrence 1:12, 13
 Glock, Jim 6:148-149
 Glomerida millipedes 3:70
 Glomeroides millipede 3:70; 5:124
Glomeroides caecus millipede 3:70
Glomeroides promiscus millipede 1:13
Glossiphaga soricina leachii bat 5:125, 127, 128
 Golondrinas, Sótano de las (SLP) 6:164-165
 Gómez Farías, Sótano de (Tamps) 1:13; 3:70; 6:175
 Gómez, Sr. Modesto 1:2, 9; 4:105
 González Cisneros, Ing. Rafael 1:9
 Gorra, Cueva de la (SLP) 3:69, 70
 Gorra, Sótano de la (SLP) 6:150
 Grande, Cueva (SLP) 2:34-36
 Greer, J. Keever 5:126-127
 Griffiths, Dr. F. P. 2:23-24
 Grillos, Cueva de los (Coah) 1:6
 Guano, Cueva del (Coah) 1:6-7
 Guerin-Meneville 4:99
 gypsum sinks 2:25; 3:49-52, 50 (photo); 4:82; 6:137, 149
- Harrison Cave (Tamps) 1:14
 Harrison, John William Francis 1:10, 11(photo)
 Harrison Sinkhole (Tamps) 1:12, 13, 14
 harvestmen 1:14
 Helman, Gary 6:156-157
 Hendricks, J. 3:70; 4:102
 Herradura, Cueva de la (Coah) 5:126
 Hershberger, Barbara 4-5⁺; 2:33-36; 4:88-89⁺, 91⁺
 Hershberger, Jim 1:4-5; 2:36; 4:88-89
 histoplasmosis 1:7; 4:88-89, 91
Histoplasma capsulatum 4:91
 Holland, Kirk 6:149-154, 155-156

- Hooton, Diana 6:149-154
Hosley, Bob 1:1-3⁺; 6:146-147⁺, 148
Hoya, Cueva de la (SLP) 3:69
Hoyas, Sótano de las (SLP) 4:84;
6:177
Huasteca, Cañón de la (NL) 2:21;
6:140-143, 141(sketch map),
142(photo)
Huasteca Canyon, Caves 1 & 2 (NL)
2:21
Huautla de Jiménez, Oax. 3:57-59,
59-67, 68; 6:159-163, 178, 180
Hubbell, Dr. T. H. 2:46-48⁺
Huckins, Jim 6:148-149
Huitzmolotitla, Sótano de (SLP) 1:2-
3; 3:70; 4:76(photo), 78, 79;
6:177
Hunter, John 1:10
- Iglesia, Cueva de (SLP) 4:84
Indian Cave (Coah) 5:127
Indios, Cueva de los (Gro) 5:127
Infierno, Cueva de El (Tamps) 3:54,
55(sketch map)
Infierno, El (Tamps) 3:54
Ingles, Lloyd G. 5:128
insurance, theft 6:171-172
isopods 2:29; 3:69, 70, 71; 4:102, 104
Ivie, Wilton 3:70; 4:99
- Jalapa, Ver. 6:177
Jalpan, Qro. 4:84-85
Jarmon Ranch, N.L. 4:88
Jeannel, Dr. Rene 6:182, 183
Jennings, Charles 1:3-4; 3:57-59;
6:137-139
Johnston, Bill 1:3-4; 2:34-37; 3:54-
56
Jones, Carolyn J. 5:128
Jones, J. Knox, Jr. 4:103
Joya de Salas, Sótano de la (Tamps)
6:132-137, 135(map), 136(photos),
174, 184
Jug Cave, N.L. 2:23
Juxtlahuaca, Grutas de (Gro) 4:86;
5:114(loc. map), 121-122; 6:177
- karst 1:7; 4:74(photo), 82; 6:152
(haystack photo), 164, 174, 176,
177, 178, 180(table of charac-
teristics)
Klem, Stanley 5:125
Knox, Orion 2:24-25⁺; 3:49-54; 4:92-
98⁺; 6:132-137
Krans, Ken 6:149-154, 155
Kreidler, John 3:57-59
- Laidlaw, Kenny 4:73-80, 80-81
Larios, Sr. Ismael 1:9; 2:40; 4:73,
80; 6:149
Lenk, Alan 6:146-147
Leones, Gruta de (NL) 2:23
Leptoneta spider 1:14
Leptonycyteris bats 5:118
- Leptonycyteris n. Nivalis bat
5:125, 127
Leptonycyteris sanborni bat 4:103;
5:127
Lewis, ("Squire") C. L. 4:73-80,
80-81⁺
Lobopoda subcuneata Dasey beetle
4:104
Lonchorhina aurita aurita bat 4:102
Long, Charles A. 5:128
Los Sabinos, S.L.P. 1:1; 2:26
Los Sabinos, Cueva de (SLP) 4:102;
6:175, 175-176
Loving, Charlie 2:33, 34-37; 3:54-
56; 6:137-139
Loving, Susan 2:22, 34-37⁺; 6:137-
139
- McAllister, Otis 5:115, 118
McGarrigle, Tommy 3:57-59; 6:156-
163
McKenzie, David 1:10, 12; 2:21, 26,
29-33; 3:52, 70, 80-87; 4:99-101
McKinley, W. L. 4:102
McLain, Jim 2:24
McLaughlin, Mac 6:137-139
Madroño, Qro.
Manire, Larry 1:10, 12; 3:70
Mante, Cd., Tamps. 4:81
maps 1:18(Sótano de Tlamaya, SLP);
2:27(Arroyo de Montecillos, SLP),
28(Sótano de Montecillos, SLP),
31(line map of Sótano de la Tina-
ja, SLP), 35(Cueva de Taninul
Num. 4, SLP), 41(Cueva de Tlama-
ya, SLP), 42(Cueva de la Selva,
SLP), 44(Cueva del Salitre, SLP);
3:51(Pozo de Gavilán, NL), 55
(sketch maps of Cueva de El In-
fierno, Cave on the Right, and
Cave on the Left, Tamps.), 60(to-
po sheet of the Huautla, Oax. ar-
ea), 61(cave loc. map, Huautla,
Oax. area), 67(sketch map of Cue-
va de Agua Carlota, Oax.); 4:87
(Cueva de los Riscos, Qro.), 90
(Cueva del Diablo, NL), 98(area
map of the Bustamante, NL region)
5:114(geol. and cave loc. map,
Gro. and Mor.); 6:133(Sótano de
Santa María, Tamps.), 135(Sótano
de Joya de Salas, Tamps.), 138
(Sótano de San Francisco, Tamps.)
141(Cañón de la Huasteca, cave
loc. map), 144(Gruta de San Bar-
tolo, north cave), 145(Cueva de
la Boca), 179(Sierra Madre Orient-
al, cross-section).
maps, available for sale 5:109
maps, price list of 5:110
Marques, Sr. Toribio 6:149
Martin, Marian 1:12
Martin, Paul 1:12
Martínez, Guillermo Sr. 2:34
Martínez, Sr. Luis 1:1, 5; 2:36, 37
Matehuala, S.L.P. 4:82; 6:137, 185

- Mead, Jim 2:22; 4:88-89
 medical notes 4:81
 Meloscho, Sótano del (SLP) 6:140
 membership list 6:167-171
 Meredith, Filmore 2:23-24; 3:56-57
 Meredith, Marsha 2:21, 34-37
 Mexaphaenops beetle 6:183
 Mexaphaenops Prietoi beetle 6:182
 Mexicambala milliped 5:124
 Mexicambala russelli milliped 1:13;
 3:70
 Mexiconiscus tlamayaensis isopod
 3:70
 Maxisphodrus beetle 1:13; 3:69, 70;
 4:102; 6:139, 183, 184
 Maxisphodrus gertschi beetle 3:70;
 6:184
 Maxisphodrus profundis beetle 4:102;
 6:184
 Maxisphodrus tlamayaensis beetle
 4:102; 6:184
 Maxisphodrus veraecrucis beetle 3:69
 6:184
 Mexiterpes sabinus milliped 3:69;
 5:124
 millipeds 1:12, 13; 2:29; 3:54, 56,
 58, 69, 70; 5:124-25; 6:143
 Milliped Cave (Oax.) 3:58, 61(loc.
 map), 63, 66(sketch map)
 Mimon cozumelae bat 4:102
 El Mirador, Gro. 6:157
 Miramar, Cerro S.L.P. 6:177
 Mitchell, Bob 1:9
 Modisimus sp. spider 1:14
 Mogote, Cuevacita de (Gro) 5:122
 Mogote, Grutas de (Gro) 5:122-23;
 6:158-159
 Mohr, Charles E. 5:117
 Monclova, Coah. 1:5-6
 Montecillos, Sotanito de (SLP)
 2:26-29; 6:175
 Montecillos, Sótano de (SLP) 2:26-
 29; 6:175
 Monterrey, N.L. 2:22; 6:140-143;
 6:173-174(area), 180
 Montes, Cueva de (NL) 2:23
 Moore, Tony 1:1-3
 Morelos formation 5:112
 Mormoops bats 5:118, 125, 126, 127
 Mormoops mormoops megalophylla bat
 5:125, 127
 Muller, Florencia 5:118
 Mysidacea 2:32
 Myotis nigricans dalquesti bat 5:125
 Myotis thysanodes aztecus bat 5:127
 Myotis thysanodes thysanodes bat
 5:126, 127
 Myotis velifer bat 5:128
 Myotis velifer incautus bat 5:126
 Myotis velifer velifer bat 5:126,
 127
 Nacimiento del Agua Chica, Cueva del
 (SLP) 4:83
 Nacimiento del Río Frío, Cueva del
 (Tamps) 6:174-175
 Natalus stramineus mexicanus bat
 5:127
 Natalus stramineus saturatus bat
 national parks 4:92-93
 Navidad, Gruta de la (SLP) 6:151,
 153(map)
 Nelson, Dave 6:149-154, 155-156
 Novick, Alvin 4:103
 Ocote, Cueva de El (Hgo) 3:70
 Ojo de Agua Grande, Cueva de (Ver)
 4:104
 Orizaba, Ver. 6:178
 Orthoporus millipede 5:124
 Ortiga, Sótano de (SLP) 2:38
 Oxolodt Cave (Yuc) 4:99
 Oxtiupam, Cueva de (Oax) 3:68
 Ozaelinae beetle 4:102; 6:185
 Oztoatlcholoa, Sótano de (Ver)
 6:178
 Pablillo, N.L. 3:52
 Pablillo, Sumidero de (NL) 3:51
 (photo), 52
 Pachón, Cueva del (Tamps) 2:25
 Pachyteles urrutiai beetle 4:102;
 6:185
 Palmito, Gruta del (NL) 3:56-57, 71;
 4:92-98, 102; 5:108; 6:174,
 182, 185
 paintings, cave 5:121
 Parachistes millipede 1:13
 Paracophus cricket 1:14
 Paracophus apterus cricket 1:14
 Paratrechus beetle 6:182, 183
 Paratrechus sylvaticus beetle 6:183
 Pearse, Dr. A. S. 5:124
 Pease, Chuck 6:149-154
 Peláez C., Sr. Eliseo 6:146
 Pendleton, Joe 4:73-80, 80-81
 Penita, Cueva de la (Gro) 5:123
 Peters, Ted 2:37-43
 Phillips, Tommy 3:70
 Pholcidae-spider family 1:14
 photographs 1:11(Frank Harrison);
 2:30(Sótano de la Tinaja, SLP),
 39(top-Sótano de San Antonio, SLP,
 bottom-Xilitla road), 45(Cueva
 del Salitre, SLP); 3:50(top-dirt
 sink near Galeana, NL, bottom-
 Sumidero de Pablillo, NL); 4:74
 (top-Inter-American Highway near
 Huichuhuayán, SLP, bottom-Tlamaya
 solution valley), 76(top-Sótano
 de Huitzmolotitla, SLP, bottom-
 Sótano de Tlamaya, SLP), 77(Sóta-
 no de Tlamaya, SLP); 5:116(Grutas
 de Cacahuamilpa, Gro), 120(Gruta
 de la Estrella, Gro); 6:136(Joya
 de Salas, Tamps), 142(Cañón de la
 Huasteca, NL), 152(Xilitla area),
 158(top-Cueva de San Agustín, Oax,
 bottom-Gruta de la Estrella, Gro),
 162(Sótano de San Agustín, Oax)
 photography 6:171-172

- pictographs 5:121
 Pinal de Amoles, Qro. 4:85
 Pine, Ronald H. 4:103; 5:127
Pipistrellus subflavus bat 5:127
Pipistrellus subflavus veraecrucis
 bat 5:127
 pits—see caves or proper name
Plecotus macrotus (=Mexicanus)
 bat 5:128
Plecotus townsendii australis bat
 5:127
 Plemons, Terry 5:108
 Poco Ventana, Sótano de (Cueva de)
 also Cueva de Ahuate Num. 2
 (SLP) 6:147
Polydemisda millipede 5:124
 Potrerillos, Cueva de (SLP) 4:103
Porcellio gertschi isopod 3:70
 Pozo Meléndez (Gro) 5:114(loc. map),
 122; 6:177
 Pozo, Sótano del (SLP) 4:84, 104;
 6:177
Procambarus crayfish 4:83
 Profesor, Sótano del (Ver) 3:69;
 6:184
Prospodrus beetle 6:184
Prospodrus waltoni beetle 6:184
Protrichoniscus bridgesi isopod 3:71
Protrichoniscus villalobosi isopod
 3:71
Pseudoeurycea belli salamander 1:12
Pseudoeurycea scandens salamander
 1:12; 4:104
 pseudoscorpions 1:14
Pteronotus davyi fulvus bat 5:127
Pteronotus rubiginosus mexicanus
 bat 5:125
Pteronotus suapurensis suapurensis
 bat 4:103
Pterostichus (Ithyocus) beetle 6:185
 Puente de Dios (NL) 2:23
 Puente de Dios (Qro) 4:84
 Puente de Dios del Río Jalpan, Cueva
 de (Qro) 4:85
 Puente de Dios del Río Jalpan, Sótano
 de (Qro) 4:84-85
 Puerto Animas, Qro. 4:84, 85

 Quintero, Grutas de (Tamps) 6:176

 Rabb, George B. 4:103
 Raíces, Sótano de las (SLP) 6:147
 Raines, Terry 1:9+, 15-17a+, 20;
 2:37-43, 48; 3:69, 71; 4:72, 73-
 80+, 99, 105+; 5:106, 108+, 124;
 6:140-143, 156-163+, 173-181+, 184
 rainfall, in Mexican karst areas
 6:180
 Ramiero, Lucas 1:10
Rana pipiens frog 1:12
 Rancho del Cielo, Tamps. 1:10, 12-
 15; 3:54-56; 4:102; 6:174
 Rancho del Cielo No. 3, Cueva de
 (Tamps) 1:13, 14; 3:70
 Rancho del Cielo No. 7, Cueva de
 (Tamps) 1:13, 14; 3:70

 Rancho de Huitzmolotitla, S.L.P.
 4:73, 80, 105
 Rancho de Suchallo, S.L.P. 4:79, 80
 Reddell, James 1:5-8+, 10+, 12-15+;
 3:49-54+, 69-71+; 4:82-87, 99-
 101+, 102-104+, 105; 5:119, 122,
 123, 124; 6:178
 Reddell, Janie 4:82-87
 Reed, Bob 6:132-137
 Rehder, Harald A. 4:104
 relief, in Mexican karst areas
 6:180
 Repa, Janet 6:139-140
 Repa, Joe 6:139-140
 resurgences 6:174, 175, 176
 Rhachodesmidae milliped family 1:13
 5:124
Rhadine beetle genus 3:53; 4:82,
 102; 6:183, 184, 185
Rhadine araiyai beetle 4:102; 6:185
Rhadine araiyai babcocki beetle
 6:185
Rhadine araiyai howdeni beetle
 6:185
Rhadine babcocki beetle 4:102
Rhadine boneti beetle 4:102
Rhadine howdeni beetle 4:102
Rhadine medellini beetle 4:102;
 6:185
Rhadine pelaezi beetle 4:102
Rhadine rotgeri beetle 4:102; 6:185
 Rhodes, Dr. Everett 4:88
 Richards, Jim 1:1-3
 Richards, Ron 6:146-147
Ricinoides ricinulid order 4:99
Ricinulei ricinulids 1:7; 4:99-100,
 101(drawing of Cryptocellus bo-
neti)
 ricinulids—see Ricinulei
 Riley, Don 3:56-57
 Rigg, Rick 4:73-80, 80-81
 Río Amacusac, Gro. 5:119
 Río Chontalcoatlán, Gro. 5:119
 Río Grande Valley Caving Club 3:56
 Río Huichihuayán, Nacimiento de,
 S.L.P. 4:79
 Río Iglesia, Oax. 6:178
 Río Iglesia, Cueva del (Oax) 3:61
 (loc. map), 63-64
 Río Iglesia, Sótano del (Oax) 3:57,
 61(loc. map), 63-64
 Río Jalpan, Qro. 4:84
 Río Jalpan, Sumidero del (Qro) 4:84
 Río Sabinas, Nacimiento del, Tamps.
 1:4
 Río San Jerónimo, Gro.
 Río Verde, S.L.P. 2:33
 Riscos, Cueva de los (Qro) 4:85-86,
 87(map)
 rivers, subterranean (in Gro.) 5:119
 rock fall data 4:172
 Rodemaker, Jim 6:146-147
 Rotonda, Sótano de (SLP) 6:146
 Rusias, Cueva de las (SLP) 4:83
 Russell, Bill 2:21+, 24+; 3:57-59,
 59-67+, 68+, 69, 70; 4:105;
 5:124; 6:156-163, 173-181+
 Russell, Maudanne 1:4-5

- Salalces, Chih. 1:7
 salamanders 1:12; 4:84, 103
 Salitre, Cueva del (Mor) 4:103
 Salitre, Cueva (Sótano) del (SLP)
 2:40-43; 4:78; 6:177
 San Agustín, Oax. 3:57-59; 6:159-163
 San Agustín, Cueva de (Oax) 3:57, 61
 (loc. map), 64, 68; 6:158(photo),
 163
 San Agustín, Sótano de (Oax) 3:57-
 58, 61(loc. map), 65; 6:159-163,
 162(photo), 178, 184
 San Antonio, Sótano de (SLP) 2:39
 (photo); 6:177
 San Bartolo North, Gruta de (NL)
 2:21; 6:140-143, 144(map), 174
 San Bartolo South, Gruta de (NL)
 2:21; 6:140-143, 174
 San Francisco, S.L.P. 4:82-83
 San Francisco, Sótano de (SLP) 4:82-
 83; 6:138(map), 139
 San Juan, N.L. 6:140
 San Miguel dolina (Oax) 3:58
 San Rafael de los Castros, Sótano de
 (Tamps) 2:33
 Santa Fé, N.L. 3:49
 Santa María, Sótano de (Tamps) 6:132,
 133(map)
 Santiago, Gruta de (NL)-see Boca,
 Cueva de la
 Santiago, N.L. 2:22
 Santo Tomás, Chih. 1:7
 Santo Tomás Caverns (El Socavón)
 (Chih) 1:7
 Saussure, Raymond de 5:125
 Scaritini beetle tribe 6:184
 Schermerhorn, Barbara 6:148-149
 Schermerhorn, J. H. 6:148-149, 171-172+
 Schreiber, Richard 6:149-154, 155-156+
 Schultz, George A. 3:70, 71
 Schuyler, Cort 6:149-154
 scorpions 6:143
 Seiser, Felix 3:57
Selenophorus beetle genus 6:185
 Selva, Cueva de la (SLP) 2:40, 42
 (map); 3:69; 6:171
 Sewer Cave (SLP) 4:80
 Shelter Caves 1 and 2 (NL) 2:23
 shrimp, white, blind 2:32
 Sierra de El Abra 6:175-176, 180
 Sierra de Guatemala (Tamps) 6:180
 Sierra de la Iguana (NL) 4:88
 Sierra Madre del Sur 5:111
 Silleta, La (SLP) 4:74(photo);
 6:152(photo from), 151, 155
 sinks, unnamed, near
 Valle de los Fantasmos (SLP)
 4:82; Valle de los Sótanos (SLP)
 4:83
 sinks, collapsed, rumored (Gro)
 5:119
Siphonophora milliped genus 1:13
 Slemaker, Carroll 5:115, 118
 Smith, A. Richard 1:19+; 2:48; 3:49-54
 Smith, Bob 3:56-57
 Smith, Clare D. 4:103
 Smith, Mac 2:33
 Smith, Richard M. 1:3-4; 4:82-87
 6:139-140
 snails 4:104
 Southmost College 1:10
 Spencer, Stanley 4:73-80, 80-81
Speocirolana 3:69
Speocirolana bolivari 3:69
Speocirolana pelaez 3:69, 71
Speocirolana thermydronis isopods
 4:102
Sphaeriodesmus genus of milliped
 1:13
 sphodrinini beetles 3:69, 84, 86
 spiders 1:14; 2:29; 4:82; 6:143
 Spirostreptida millipeds 5:124
 Starr, Frederick 3:68
 Stearns, Randal 6:163-167
Stemmops sp. 1:14
Stenopelmatus sp. cricket 1:14
 Stewart, Bud 6:156-159
 Styloidesmidae milliped family 1:13;
 5:124
 Suchallo, Sótano de (SLP) 4:79;
 6:146
 Sustare, Dennis 3:54-56+
 Sustare, Judy 5:108
 swallows 1:3,5
Syrrophus latodactylus frog 1:12

 Tabasco, karst in the state of
 6:178
 Tablas, Cueva de las (Qro) 4:84;
 6:184
Tachys (Tachys) proximus beetle
 4:104
Tachys unistriatus beetle 6:185
Tadarida aurispinosa bat 5:125,
 126
Tadarida brasiliensis bat 4:103
Tadarida brasiliensis mexicana bat
 5:125, 126, 127, 128
Tadarida laticaudata ferruginea
 bat 5:125
 Tamapatz, S.L.P. 6:164-167
 Tamuín, S.L.P. 1:1
 Tandy, Mills 2:24-25
 Taninul No. 1, Cueva de (SLP) 4:99
 Taninul No. 4, Cueva de (SLP) 2:34
 Taylor, Robert 6:148-149
 Tejamanil, Cueva de (Qro) 4:85
 Tejamanil, Sótano de (Qro) 4:85;
 6:183
 Tequila, Ver. 3:69; 6:159, 178
 theft, from autos 6:171-172
 Thomas, Dick and son 3:56-57
 Thompson, Tom 6:149-154
 Thompson, Tony 6:149-154, 155-156
 Thren, Bob 4:73-80, 80-81
 Tigre, Cueva del (Son) 4:103;
 5:127
 Tigre, Sótano del (SLP) 6:175
 Tinaja, Sótano de la (SLP) 1:1-2,
 4, 5; 2:29-33, 31 (photo), 36-37;
 3:54, 71; 6:175
 Tlamaya, S.L.P. 3:70; 4:73-78, 74
 (photo of valley); 6:152 (photo)

- from La Silleta looking east), 177
 Tlamaya, Sótano de (SLP) 1:2, 3, 4,
 15-17, 17a (map-profile); 4:73-78,
 76 (photo), 77 (photos), 102, 105;
 6:147, 148-149, 154, 177, 184
 Torre, Luis de la 5:127-127
 Tracy, Cindy 2:48; 5:108
 Tracy, Tom 6:159-163
 Transverse Volcanic Belt 5:111
 Trechini-beetle tribe 6:182-183
 Trechus beetle 6:182
Trechus aztec beetle 6:182
Trechus toluensis beetle 6:182
Trichopetalidae-millipede family
 3:69; 5:124
 Trichoptera 1:2
 troglobites 1:12, 13, 14; 3:69, 70;
 4:102; 5:124-125; 6:182-185
 troglophiles 1:13, 14; 3:70; 4:102;
 6:185
 troglonexes 1:13; 6:185
 Troncones, Cueva de los (Tamps) 5:126
 Turner, Merydith 1:4-5; 3:54-56, 56-57
Typhlotricholigioides aguaticus
 isopod 4:104
- Vaca, Sótano de la (SLP) 6:146
 Vaisnys, Jouzas R. 4:103
 Valle de los Fantasmos, (SLP) 6:137-
 138, 184; 4:82
 Valle de los Sótanos (SLP) 4:83
 Valles, S.L.P. 1:5; 2:29, 33, 34-
 37; 3:70; 4:81
 vandalism 4:105
 Vandel, A. 3:71; 4:104
 Varnadoe, Wm. W. Jr. 5:125
 Venadito, Sótano del (Tamps) 4:99;
 6:176
Venezillo tanneri isopod 3:70; 4:104
Ventana Jaballí 1:1; 3:71; 6:148, 176
Vespertilio (=Myotis) velifer bat
 5:128
Vesperugo veraecrucis (=Pipistrellus
subflavus veraecrucis) bat 5:128
 Victoria, Cd., Tamps. area 6:174
- Wagner
 Wagner, John 6:148-149
 Walker, Charles F. 4:104
 Ward, Henry L. 5:128
 Warden, Tom 2:23-24+
 Water Trough Cave (Oax) 3:61 (loc.
 map), 62, 66 (sketch map)
 Weiler, Jim 3:52
 West, Jim 3:56-57
 Western Hemisphere, Deep Caves of 1:19
 Westmoreland, Carol 2:21, 24
 Wet Cave (Tamps) 1:13, 14
 Wiggins, Jeannie 5:108; 6:132-137
 Winsborough, Phillip 1:20; 2:37-43,
 48; 3:71; 4:72, 88-89; 5:106
- Xilitla, S.L.P. 2:37-43; 3:69; 4:73,
 74 (photo of area), 82, 84, 86;
 6:176-177, 180
- Xilitloniscus isopod 3:69
 Yarbrough, Ed 6:146-147
 Young, Sam and Diane 4:73-80
 Yucatán, karst in 6:178
- Zapaluta, Cueva de la (Chis)
 4:103
 Zarate, Lucio 1:1