A photograph of a person in a cave, wearing a blue and red wetsuit, a white helmet with a headlamp, and a backpack. The person is standing on a rocky floor, looking up at a large waterfall cascading down a dark, textured rock wall. The water is illuminated from above, creating a bright blue glow. The cave walls are dark and have a rough, layered appearance. A bright light source on the right side of the frame creates a lens flare effect.

AMCS
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Number 22 May 1997



AMCS

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The *AMCS Activities Newsletter* is published by the Association for Mexican Cave Studies, with assistance from William Russell. This issue was edited by Bill Mixon, with help from Katie Arens, Oscar Berrones, Jim Coke, Gill Ediger, Vico Jones, Susie Lasko, Mark Minton, Gary Napper, and Peter Sprouse.

The *Activities Newsletter* seeks articles and news items on all significant exploration and research activities in the caves of Mexico. Photographs suitable for the covers and other full-page applications are also sought. They need not relate to an article in the issue, but the original slide or negative must be available on request for printing full-page photos. All material may be sent to the AMCS address. Those planning an article may contact the AMCS for the name of the editor and the schedule for the next issue. Better yet, just send it now.

The Association for Mexican Cave Studies is an informal, nonprofit organization dedicated to the exploration, study, and conservation of the caves of Mexico. All previous issues of the *Activities Newsletter* are available, as are various other publications on caves and cave life in Mexico. Write for a list of publications.

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Front cover

Nancy Pistole in the entrance canyon of Cueva de El Chorreadero, Chiapas.
Photo by Dave Bunnell.

Back cover

Noel Sloan and Steve Porter carrying equipment in the Upper Gorge at a depth of 700 meters in Sótano de San Agustín, Oaxaca, during the 1994 San Agustín Expedition (see article in last issue).
Photo by Wes Skiles.

Frontispiece

Peter Sprouse climbing the third drop in Pozo de la Neblina, Coahuila.
Photo by Susie Lasko.

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Ruben Comstock on one of the many short climbs in Cueva de El Chorreadero, Chiapas.
Photo by Dave Bunnell.

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MEXICO NEWS

Compiled by John Stembel and Bill Mixon

CHIAPAS

On April 29, 1996, five experienced Italian cavers entered a new cave near the **Río Encajonado**. The cave is a resurgence, starting with 700 meters of low, wet passage. After the initial wet passages, there are large dry passages and branches. The five Italians were exploring, mapping, and photographing in the dry passage.

Although it was the beginning of the dry season, they had three days of rain. Rising water in the cave sumped the first 700 meters. The cavers began their wait in the dry area. On the outside, one of the trapped cavers' friends, Valerio Sbordoni, returned to Malpasó by boat and contacted some American divers. In turn, they contacted Ricardo Alvarez, a diver living in Tuxtla Gutiérrez. With the help of local caver Ruben Comstock, they succeeded in finding scuba gear and a helicopter after two days of phone calls. In the meantime, the flood ended, but the water level remained high. The cavers tried to push toward the exit, and they reached a room just 70 meters in. Just under sixty hours after the flooding began, Ricardo entered the sump and quickly reached the cavers. Their condition was quite good. By the morning of May 2, all were outside, safe and unharmed. *Source: Graziano Ferrari of Italian Cave Rescue.*

The **Cañon del Sumidero** is a well-known tourist site 15 kilometers east of Tuxtla Gutiérrez. The

Grijalva River flows approximately 20 kilometers through sheer canyon walls to the Mañuel Moreno Torres Dam, better known as Chicoasén. It is one of the largest dams in Latin America. The canyon is only accessible by boat, and plenty of tourists take the boat ride to the dam. The canyon walls are impressive, sometimes as high as 700 meters above the lake bed.

One of the many attractions in the canyon is the beautiful **Árbol de Navidad**. The Christmas Tree is a beautiful flowstone cascade formed on the canyon wall. At the top of the formation, a small black hole can be seen. This cave and the water that spews from its mouth are the obvious cause of the Christmas Tree.

The lure of the unknown and the challenge of gaining access to this spectacular cave entrance caused Italian cavers to rappel from the top of the canyon. Using radios to help locate the proper point to descend, they eventually gained access to the cave. Unfortunately, the cave passage sumped after only a short distance. *Source: "La Storia dell' 'Arbol de Navidad,'" by Tono De Vivo, Speleologia 33, October 1995.*

In fall 1995, the Italian La Venta Exploring Team, joined by one Slovenian caver, visited central Chiapas. On the plateaus and within a few kilometers of the **Río La Venta** canyon, which overall is 80 kilometers long, they discovered seventeen new caves, with a total length of 7 kilometers. Access to

the caves along the canyon is strenuous, as the entrances are located in the crumbling rock wall up to a hundred meters above the floor. Most of the caves had Mayan archaeological material in them. The most significant achievement of the expedition was the connection of **Sumidero II del Río La Venta**, a cave on the plateau above the canyon, with **Cueva del Río La Venta**, the resurgence of a tributary to the canyon. The system is 12 kilometers long. *Source: Dorotea Verša, "V odkrivanju mehiškega krása," Naše jama 37, 1995.*

Under the headline, "Amateur cavers recruited to help recover 7 bodies," a newspaper article attributed to the Associated Press stated that Mexican authorities had asked "spelunkers" to help recover the bodies of seven people found dead in a narrow cave near the city of **Chenalhó**. The article goes on to state that four of the victims were youths who had been violently kidnapped from a house on August 19, 1996, according to a complaint filed the previous week by family members. Human-rights workers and state officials said they did not know of any connection to the land or political disputes that for decades have characterized this small village of Tzotzil and Tzeltal Indians. The village is 25 kilometers southeast of Tuxtla Gutiérrez. *Source: Nashville Banner, August 27, 1996.*

Some exciting finds have been made in Chiapas in an area called

the Cerro Blanco about halfway between Tuxtla Gutiérrez and Villahermosa. I don't know how many pits over 200 meters deep exist in the area, but we've found a new one on just about every trip. In January 1996, Matt Oliphant and I, with friends, found a 212-meter pit at the side of the road; we call it **La Pedrada**. Our exploration ended in a tall, narrow fissure with flowing water, below an additional 26-meter drop. A larger team from the United States went in March and continued surveying. The stream passage became too narrow, but a large fossil borehole was located. It sloped downward to a sump where the passage appears to continue underwater. Almost 2 kilometers was surveyed.

About 100 meters from La Pedrada, a 180-meter pit, **Darwin**, was explored. At the bottom, a passage headed away from La Pedrada and eventually connected into the **Soconusco** system. Soconusco and **Aire Fresco** are the two largest caves in the area, both 8 kilometers long. Soconusco is over 500 meters deep. In April, a Canadian group tried hard to connect the caves, as there are several places where they come within 50 meters of each other. They ran out of time and plan to return in 1997.

In 1995, a 250-meter drop was found inside **Dos Puentes**, which is a maze of pits. Indeed, the hillside around Dos Puentes is covered with entrance pitches, many of which still need checking. *Source:* Nancy Pistole, *Descent* 133, December 1996-January 1997.

CHIHUAHUA

Grutas de Coyame is named after the nearby pueblo of Coyame, population perhaps one thousand, which is located on National Highway 16, 89 kilometers west-southwest of Ojinaga-Presidio, about a third of the way from the Texas border to Chihuahua City. The cave is about 3 kilometers southwest of town and about 300 meters to the east of the highway. In September 1993, the turnoff was easily recognized by a barbed-wire gate and a freshly bulldozed road climbing two-thirds of the way up a 200-

meter-high hill easily visible from the highway. The road ends in a parking area, from which a trail and electric wires lead upward for another 50 meters to the entrance.

The cave was previously visited by AMCS cavers in 1979 and 1980. See *AMCS Activities Newsletter* 11, page 51. I found out about it when I visited Chuck Cluck and Susan Penny in Alpine, Texas. Chuck had seen the cave marked on sheet 10 of his 1986 *Atlas de Carreteras*, but had never been there. On September 25, 1993, John and Heather Holland, Chuck, Susan, and I drove to the cave. Highway 16 follows the north side of the Río Tarahumara for about 46 kilometers across flatlands and then makes an impressive climb up to a pass between the Sierra Del Peguis to the north and the Sierra Matasguas to the south. A scenic overlook at the top of the pass gives a spectacular view of the narrow canyon of the Río Tarahumara about 250 meters below. Descending from the pass, we reached Coyame in the early afternoon. Inquiring at the Pemex station quickly produced guides, among them Manuel Calderon and *presidente* Ignacio Ortiz. Manuel told us that the community wants to develop the cave and has received some funds to do so, hence the new road and the wires strung throughout the cave. For large parties, they haul a generator up to the entrance to power the lights.

A steel ladder is used for the 10-meter entrance drop, and there is a rope ladder on the slope below. Considerable effort has gone into clearing rocks to make paths. We spent four or five hours in the cave, which is impressive, with large rooms and well-decorated passages. A survey might yield a thousand meters. Everywhere we went there were electric wires.

There have now been three visits by AMCS cavers, and the cave still needs to be surveyed by cavers. An engineer from Chihuahua is supposedly mapping the cave; we saw some of his notes. The local people are very friendly and very interested in developing and protecting the cave. They also told us of a cave called El Volcan, apparently a

strong blow-hole, in a mountain to the north or west that they pointed out from the entrance to Coyame. *Source:* Logan McNatt.

During an April 1996 trip to ride the railroad through Copper Canyon and rappel the 300-meter-high Cascada de Basaseachic, Gerald Moni, Cecile James, Gary Chambers, and Misty Sperry visited two caves. The first cave, **Gruta de Candelas**, is along the side of the road 44 kilometers west of the border town of Ojinaga. A set of stairs leads 5 meters up the road-cut to the entrance. A typical Mexican roadside religious shrine is at the entrance. The cave is only 20 meters long, but the walls are completely covered with dog-tooth spar for its entire length.

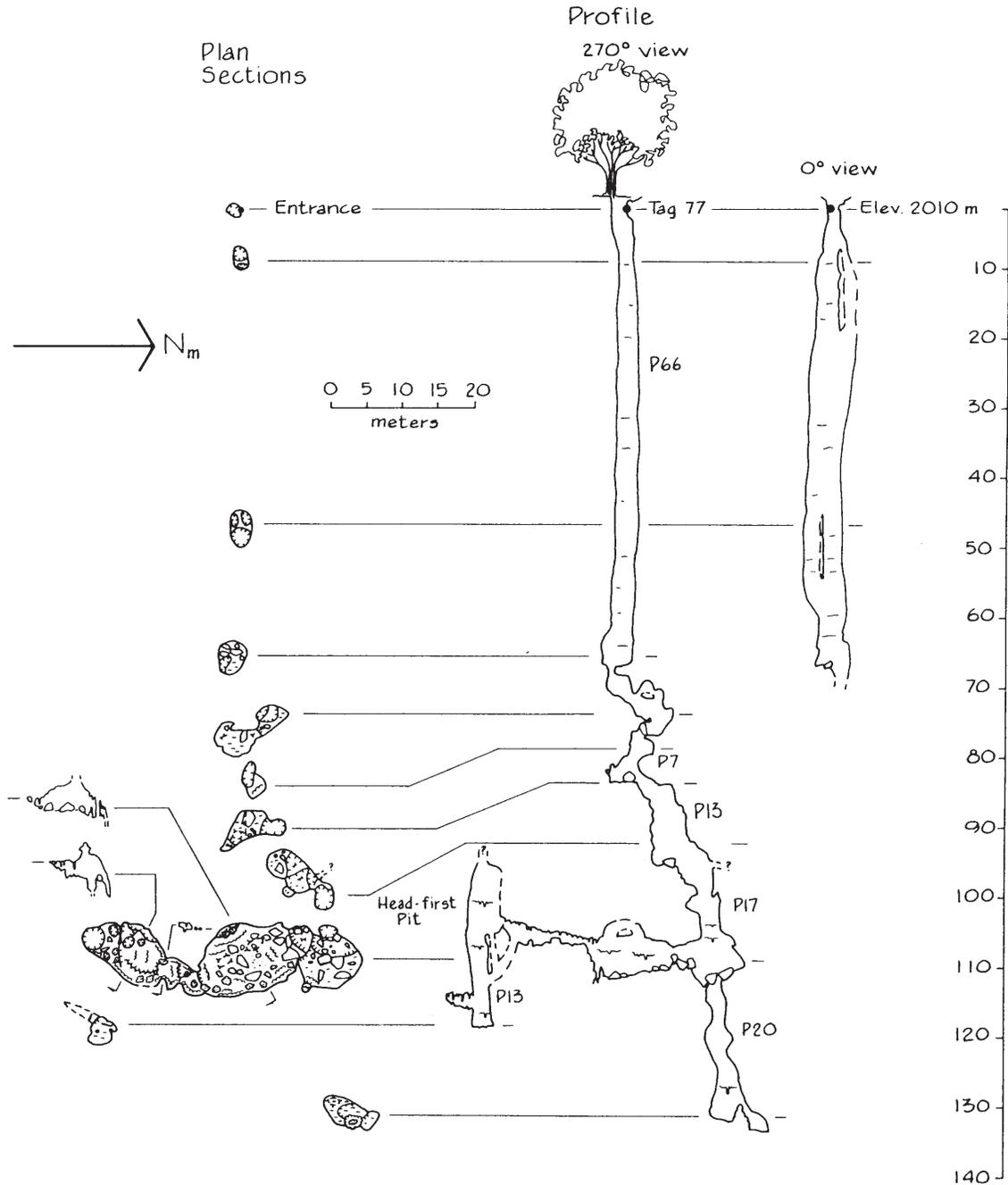
The second cave is near the Pegues Grandes Mountains and the small town of Coyame. About 10 kilometers west of town is **Grutas de Coyame**. This commercialized cave is filled with large and beautiful formations. "It is one of the most beautiful caves I have ever seen," states Moni. *Source:* Gerald Moni.

GUERRERO

Reuters News Service reported that the Mexican army discovered a cache of arms, military uniforms, and radio equipment in a cave near where a mysterious new armed rebel group recently unveiled itself. Army troops found the cave in mountainous terrain near **Coyuca de Benítez**. On June 29, 1996, dozens of masked men bearing assault weapons and wearing military uniforms appeared at protests marking the anniversary of a peasant massacre near that town, claiming they were members of the Popular Revolutionary Army. Since then, thousands of army troops have converged on the area and arrested at least eight men suspected of belonging to the EPR, the initials of the group's name in Spanish, on firearms charges. Army troops recovered from the cave twenty-five AK-47 assault rifles, one M-1 carbine, nearly three thousand rounds of ammunition, twenty-two military uniforms, twenty-two pairs of military boots, and three

Sótano de los Novios

Dulces Nombres, Nuevo León, México



Length: 204 m · Depth: 134 m · UTM coordinates E440,280; N2,652,115

Suunto and tape survey 29 December 1995

by R.M. Barksdale, P. Hollings, S. Lasko, B. Luke, B. Shade, and P. Sprouse

Drafted by B. Luke

short-wave radios. *Source:* Reuters, passed on by John Pint.

JALISCO

Searching for a horizontal cave rumored to be "so long we couldn't find the end after two days of walking," Susy and John Pint, Nani Ibarra, and Chris Lloyd were led by a treasure hunter from Barreras to a small hole atop a rocky hill. Inside, they found a vertical slot, a natural fissure less than a meter wide and about 7 meters long, in which pre-Columbian Indians had constructed a series of floors giving access to lateral tombs. Shards and human bones were found everywhere in these "vertical catacombs," which bottomed out at around 60 meters. Unfortunately, tomb robbers had long since visited the catacombs. *Source:* John Pint.

In a recent visit to **La Concha**, famed for isolated hills of top-quality marble, Susy Pint, John Pint, and Luis Rojas stumbled upon a cave that Grupo Zotz had been trying to find for nearly ten years. In 1987, the Pints heard tales of a very large cave with a passage leading ever downward to an underground river. Supposedly, a log had been placed across the river, beyond which lay more cave. Over the years, they located five caves of various sizes in this area, but not one of them fit the description of this river cave.

In June 1996, while photographing some large petroglyphs that decorate a nearby marble cliff, the Zotz cavers were shown a small cave entrance that opened into a large room. A cursory check revealed at least five passages, leading in several directions. One of these was heading downward, and the sound of running water could be heard in the distance. An impending hurricane forced the cavers to retreat immediately, but they plan to concentrate their efforts on this cave during the 1996 rainy season. *Source:* John Pint.

NUEVO LEÓN

Sótano de los Novios is in the western part of the Purificación

karst, near the mining and logging village of Dulces Nombres, Nuevo León. It is about 600 meters east of a farm called Peñuelas, at an elevation of 2010 meters. It lies in the bottom of a karst valley that contains thick terra rosa soils. The entrance pit takes a small arroyo that cuts through the soil cover.

Cavers first visited the Peñuelas area in 1974, when Mike Warton located a number of pits, including Novios. It was not until December 1995 that the cave was finally completely explored and mapped, by Marcus Barksdale, Pete Hollings, Bev Shade, Susie Lasko, Barbara Luke, and Peter Sprouse. *Source:* Peter Sprouse, "Sótano de los Novios," *The Death Coral Caver* 6, October 1996.

See also the summary of Proyecto Espeleológico Purificación activities under Tamaulipas.

OAXACA

In March 1995, an team of cavers from Switzerland, Belgium, Russia, and the United States used mules to transport nine hundred kilograms of food and gear up to a basecamp in the **Cerro Rabón** forest. The team planned to push the main cave, **Kijahe Xontjoa**, as well as search the surface for additional caves.

In a twenty-hour trip, a three-person team rigged the unusually dry Kijahe Xontjoa, carrying seventy kilograms of gear, and established a second deep camp, Camp Cairo, in the region of the Sarcophagus, at a depth of about 1150 meters. When they started mapping the next day, they found a beautiful passage with formations reminiscent of some in Lechuguilla Cave. They named the passage, which bypassed the Sarcophagus, **Vrai Sucre**, Real Sugar in French. After 150 meters of survey, they stopped at the top of a very impressive new room. With no rope, they had to return the next day. On the return trip, plenty of passages were found, including a stream passage that ended in breakdown and a sump. They almost missed another breakdown passage that led to a big, black room. At the lower end of

this room, a huge 7-by-7-meter passage with a lake was found. A quick swim in the Caribbean Sea showed that the passage was sumped.

The initial Camp Cairo team headed out after a five-day trip, with 1.2 kilometers of survey, a new 1195-meter depth of the cave, and many unfinished leads.

While the Cairo team was pushing leads deep in the cave, a team of four entered Kijahe to investigate climbs and leads near the first deep camp, Camp I or the Bat Yeck Camp. They explored and mapped many leads, including a 100-meter-deep series of pits to a dead end. They did a bolt climb in the Camp I Borehole and a photo trip to the Popocatépetl Room.

As the Cairo team headed for the surface, the Camp I team was augmented by two more cavers. Three of the original Camp I team headed out, while the remaining three cavers stayed to continue checking leads. A 30-meter pit dropped into the Subcomandante Marcos River. After 200 meters, the passage sumped at the junction of two mazy passages. A return trip to Zapatista Underground netted 260 meters of passage to a breakdown area in a large hall.

A final camp trip to Camp Cairo netted 850 meters of passage in the Crocodile labyrinth. They estimated that the maze is about half mapped.

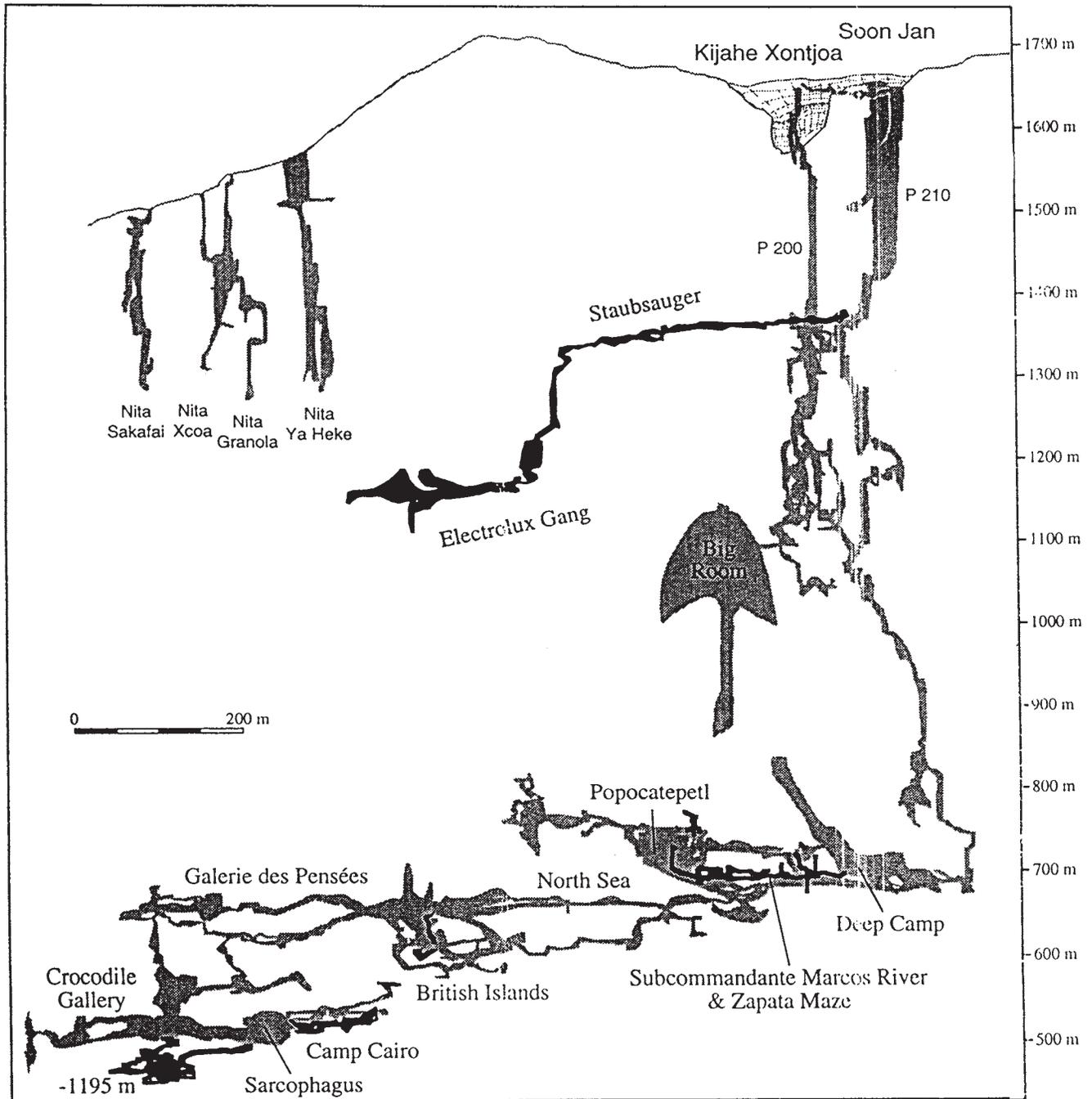
Nita Terremoto, an entrance located in 1989, was among the other caves explored. A 70-meter pit was descended to a breakdown area. Moving some blocks disclosed a horizontal labyrinth with plenty of air flow. After 480 meters of surveying in the complex maze, they found a series of short pits and muddy horizontal passages that led to a large pit. A major push the next day reached a depth of 350 meters and a length of 1280 meters, at the top of another deep pit. On a subsequent trip, the big pit was thought to be blind, but a 70-meter-plus pit was found in a tight rift reached by a 10-meter climb to a window. The pit and the cave ended in a large room at a depth of 470 meters.

A team entered the **So On Jan** entrance of Kijahe to check leads at

the -300-meter level. They found a large, fossil phreatic passage with very good airflow. It did not seem similar to the tighter, descending meander below, the known connection route to Kijahe. Following crazy airflow, a team of four surveyed 380 meters in the Lost City Transitway to a deep pit named the Staubsauger, German for vacuum cleaner. On the last exploration trip of the expedition, a two-person team bottomed the popcorn-

encrusted, 100-meter-deep pit. Following the exceptional airflow, the team encountered a huge tube full of breakdown. After a little digging and 15 meters of tight passage, they popped into a huge borehole, the Electrolux Borehole. This passage is probably the largest in volume in the entire Kijahe system. On the far side of this borehole, a narrow, descending meander took off, complete with strong airflow. They stopped at the top of a pit, after 850

meters of survey. Many surface pits were checked, most less than 50 meters deep. A notable exception was **Big Tree Pit**, a 70-meter shaft with no leads. A few deep shafts were found, one estimated to be 100 meters deep and another 60 meters, but were not descended due to time constraints. In all, seventeen new caves were explored. Kijahe Xontjoa is now 1195 meters deep and in excess of 25 kilometers long, with



many leads remaining.

While cave exploration continued, a team of three did a complete traverse of the **Santo Domingo Canyon**. During the 86-kilometer trip, from Cuicatlan to the bridge in the town of Santo Domingo, they encountered strong winds, many rapids, and unrelenting sun. They portaged a few of the nasty rapids, but swam the rest. *Source: Post-expedition circular by Karlin Meyers, December 1995.*

An article by Trevor Shaw describes a book by J. W. Valvasor, with Erasmus Francisci as collaborator, *Die Ehre dess Herzogthums Crain . . .*, in which a cave close to the town of Cuertlavaca, near Oaxaca, is described. Attempting to track the source of the information for the cave description, Shaw notes that the 1689 text is taken almost verbatim from O. Drapper's 1673 edition of *Die unbekante Neue Welt oder Beschreibung des Welttheils Amerika, und des Sud-Landes*, translated by J. C. Beers. The information contained therein came, via Laet's 1625 book, from Vásquez de Espinosa's then unpublished manuscript of about ten years earlier. The same description appears in the Dutch version and the English translation; it reads:

Not far from the Village Cuertlavaca, lies a high Mountain, remarkable for a strange Cave, whose Entrance is very narrow, at the end whereof appears a square Place of fifty Foot, upon one side whereof stand Pits with Steps; near which begins a crooked Way of a League long; at the end of which is a spacious Place with a Fountain of good Water; from the Foot of which flows a small Brook: But because none have made any farther discovery of this Cave, the other parts of it remain yet unknown.

Even though Laet's description of 1625 was the earliest to be printed, Shaw speculated that Laet must have obtained his information, perhaps in his capacity as a director of the Dutch West India Company, from the Spanish traveler Antonio Vásquez de Espinosa, whose own nearly identical account was written about the same time,

but not published until the twentieth century:

In the villages of Cuertlavaca and Tequixtepec there is a very high sierra, and on its slopes there is another cave with a mouth so narrow that a man can hardly get through it; immediately one enters a square room over 50 feet high, and beyond this reception chamber there are flights of steps; next there is a passage with many turns like a labyrinth, through which one walks following a cord which serves as a guide to keep one from getting lost and which is fastened at the entrance. Beyond this labyrinth there is a large plaza and in the midst of it a spring of excellent water; the heathen did not venture to drink it, for they considered that it was sacred and that those who drank of it, would die; at one side of this spring runs a little stream. The cave goes much farther; they have never found the end of it; the heathen considered it a holy place.

Espinosa's information on the cave, which seems to be based on a visit to it, therefore dates probably from 1612 or 1613. Does anybody know what cave this might be? Trevor Shaw would appreciate any further information. *Source: Trevor R. Shaw, "Earlier Knowledge of the American Caves Reported in Valvasor's 'Die Ehre dess Herzogthums Crain' (1689) - from 1513," Acta Carsologica, volume 24, 1995, by Trevor R. Shaw. (The 1513 date is for a visit to a cave on Hispaniola mentioned in the same book.)*

A joint Mexican-British expedition has explored a new limestone area at **Flor Batavia**. They covered a fairly extensive area. **Cueva del Viejito** is a large, multi-entrance stream cave 2.4 kilometers long and 200 meters deep, with a 150-by-50-meter breakdown chamber with ancient terracing. **Sumidero de Arroyo Seco**, a dry sink that is usually blocked, was entered, and the cave was explored to 570 meters length and 160 meters depth. **Cueva de Doña Leya** is a large fossil cave 300 meters long and 80 meters deep. **Sumidero del Peñasco** is 200 meters long and contains a small stream. **Cueva de Loma Palma** is a

fossil cave, also 200 meters long.

Numerous other small caves were explored, and several shafts and other entrances were seen, but not entered. The expedition proved that there are well-developed caves in the area, and future potential is thought to be good. The main problem is poor access, there being very few good trails. *Source: The International Caver 18, 1996.*

PUEBLA

Since 1991 a team of British and Mexico City cavers have been exploring and mapping caves in the Cuetzalan area. The hope for their 1995 trip was to connect **Sistema Cuetzalan**, 34 kilometers long and 658 meters deep, **Sistema San Andrés**, 10 kilometers long and 474 meters deep, and **Cueva de Alpazat**, 7 kilometers long and 113 deep, which would establish a 50-kilometer cave system over 900 meters deep.

In 1994, flooding had trapped cavers deep inside San Andrés, when water in their camp rose 25 meters. Pushing either the bottom of Cuetzalan or San Andrés would require long, difficult trips to very remote areas. Pushing upward in Cueva de Alpazat turned out to be a much better prospect. Before push trips began, telephone wire was installed in the cave to the previous limit. A cache of food and carbide was also established on the far side of the sumpy section of Alpazat, in case the water rose too quickly.

A total of eleven cavers worked for three weeks pushing leads in Alpazat trying to connect to Cuetzalan or San Andrés. Many domes were climbed or bypassed by the determined cavers. Rain forced two evacuations of the cave, the second one delaying exploration for six days, as they waited for the sumps to drain.

In all, a total of 4.5 kilometers of passage was added to the Alpazat survey. While some of the newly surveyed passages lay tantalizingly close to known passages in the larger caves, no connection was ever established. Many leads were left unexplored due to time constraints.

Many other caves and potential

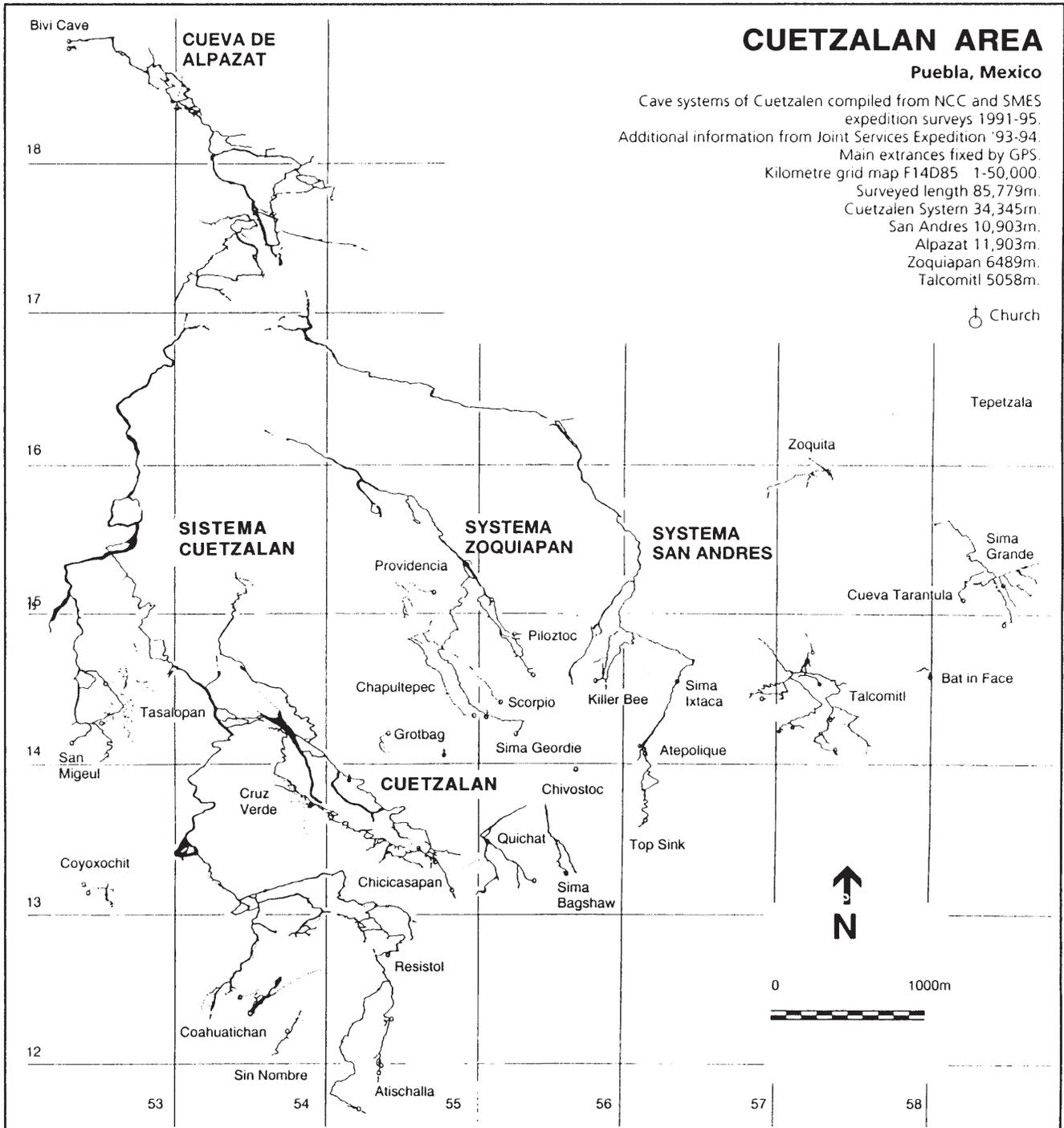
cave sites were also investigated. Most were checked only cursorily. A total of 85 kilometers of passage has been surveyed in the area in five expeditions since 1991. *Source:* Tim Allen, "Cuetzalan '95," *Caves and Caving* 70, winter 1995.

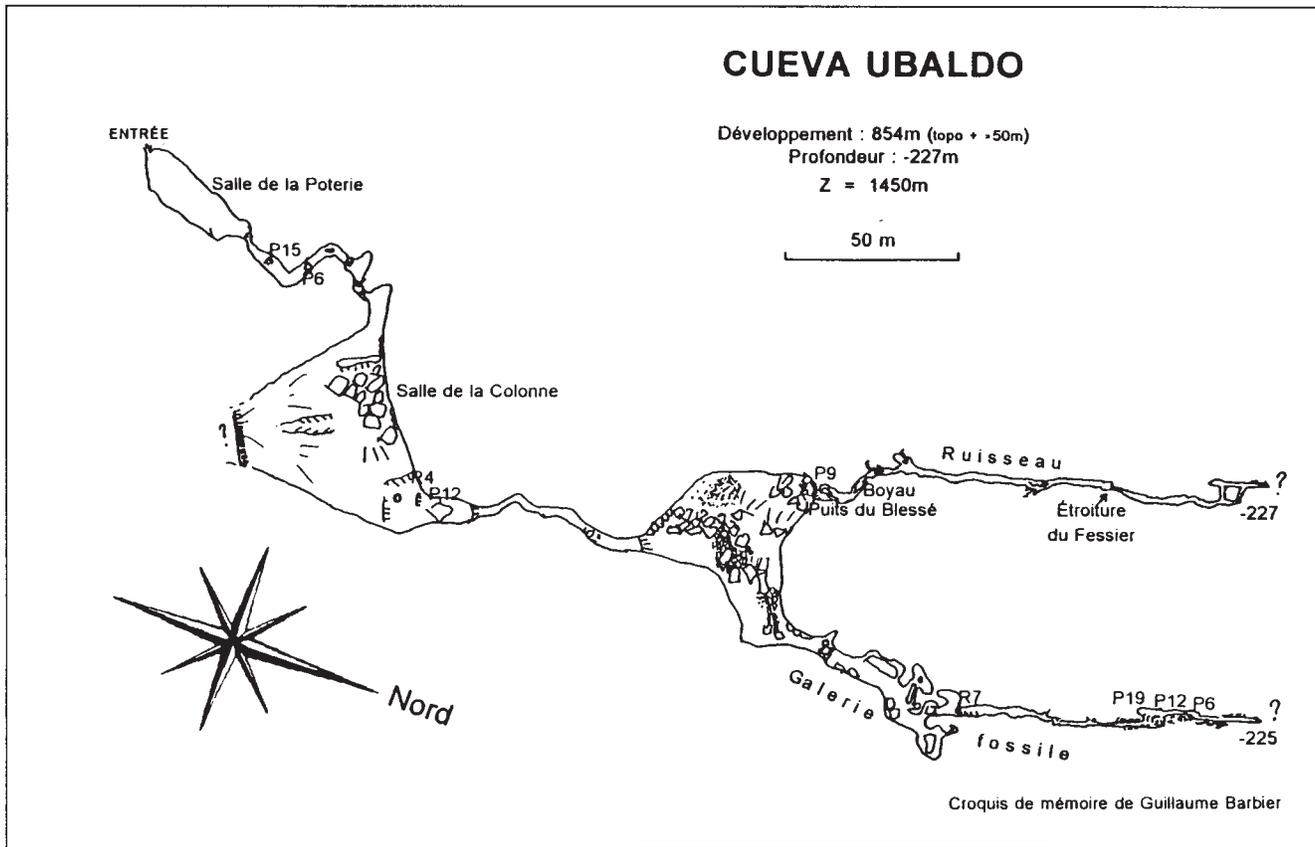
The 1996 expedition to the Cuetzalan area discovered two important new caves. During shaft-

bashing near Tenego, the small entrance to **Sima Castor** was found. It led into a small streamway and the top of a 7-meter shaft. Below this, another crawl led to a 20-meter pit that intersected a much larger passage. To the left, the passage was followed for 1.8 kilometers to a connection with **Sima Grande**. Downstream, there was a drop to a sump, but climbs above this led to

a continuation that was surveyed for 750 meters and is still going. Another passage was found that descended to a pit about 30 meters deep with a stream at the bottom, but the party did not have a rope to descend. Altogether, 2.8 kilometers of new cave was explored, making the total length of **Sima Castor-Sima Grande** 5.1 kilometers.

Cueva Tepetzala, a resurgence





cave near the village of the same name, was explored up a sporting streamway to a 12-meter climb that was not passed due to bad rock. It is about 1.6 kilometers long and contains two possible leads.

The expedition also looked at some small caves near Zoquiapan and surveyed beyond the Nick-point in San Miguel, seeking a possible connection to Alpatat. *Source: The International Caver 18, 1996.*

Over the 1996 Thanksgiving holiday, a group of Texas cavers ventured into northern Puebla to recon an area south of the town of Chicontla, on the Filomento Mata 1:50,000 topo. The map indicated that two rivers sank into separate closed depressions near the town of Arroyo Hondo. After three days of negotiations with state and local authorities, permission was obtained to enter the area to search for caves. Field investigations revealed that the rivers did not sink, but continued their courses uninterrupted to the coastal plain, an apparent error on the part of the Mexican topo makers.

The group was shown Sótano de Julio. A small surface pit was explored down a couple of broken pitches to the end of a 90-meter rope. From there, rocks fell an additional second and then bounced and rolled out of sight. The group was told of a large cave with formations that is located near the town of Cuamaxalco, about 1.5 kilometers northwest of Arroyo Hondo.

Anyone interested in visiting the area should be aware that the state police have representatives in the region and that they expect to be notified before cavers enter the back-country to explore. *Source: Jerry Atkinson.*

Beginning in 1984, the Société québécoise de spéléologie has been visiting the Sierra Negra, at the junction of southern Puebla, northern Oaxaca, and western Veracruz. In January 1994, the sixth expedition, five cavers from Quebec and five from France, spent two weeks in the heights, at 2200 meters, and two weeks in the area of Tepepa, at 1400 meters. They explored 8065

meters of cave, of which they surveyed 7035 meters, not bad considering the difficult terrain and the rainy weather—eighteen days of rain out of thirty. Although Mexico has a reputation for large caves, seven of the eleven entrances discovered were less than 1.5 meters in diameter. The Sistema de Tepepa (previously Sistema de Niebla), Puebla, was pushed to a depth of 799 meters. Cueva Ubaldo, Puebla, was explored during January 26–30. It is 860 meters long and 227 meters deep. *Source: Guillaume Barbier, "L'exploration de la Cueva Ubaldo," Grottes & Gouffres 135, March 1995.*

For the seventh time, the Société québécoise de spéléologie organized an expedition to the Sierra Negra. A group of eight cavers, six from Quebec and two from France, established their base camp at the usual spot at Tepepa, where it remained from December 19, 1996 until January 10, 1997. The main objective was pushing TP4-13, Nelfastla de Nieva, to a depth of 1000 meters, a known obsession.

Despite very fair weather and uneventful caving trips, discoveries were scarcer than they are used to. New, neighboring caves were found and mapped. A ridge at 1600 meters elevation was prospected for higher entrances, unsuccessfully. Still, some areas are left to check on a future trip.

In TP4-13, many trips were made to the Via Lactea level, 200 to 300 meters deep, disclosing more of the mazy-popcorn type of passage and a beautiful river section at -350 meters. Finally, a few days before the end of the expedition, a new cave was explored to -300 meters, where is connected to the system, now called **Sistema de Tepepa**, which is now about 850 meters deep. It is the deepest cave in the Sierra Negra and the deepest cave ever fully explored by the SQS. A lot of work will have to be done to revise the map of the system based on this expedition. Large areas of the cave have to be checked for potential connections, and a return is planned in 1998. *Source:* Marc Tremblay.

QUINTANA ROO

A widely published article by Gary Walten reported a link between the world's two longest underwater caves, **Nohoch Nah Chich** and **Dos Ojos**, forming Mexico's longest cave. This link, however, is not an underground connection. When Wes Skiles, Tom Morris, Chuck Stevens, and Mike Madden went to check on the link from the Nohoch end, they found the dive line left a remote cenote, then ran on the surface through the jungle across a karst bridge before returning underground at a cenote associated with Dos Ojos. The total distance separating the two caves across the surface is approximately 200 meters. *Sources:* Gary Walten, "Sistema Ejido Jacinto Pat," *Underwater Speleology*, volume 23 number 2, March-April 1996 (and several other places); note by R. W. S[anton?] in *Cave Diving Group Newsletter* 121, October 1996.

On Sunday, June 16, 1996, six divers were arrested at Chuu Ha Cenote on Cozumel and charged

with violating a historical monument. Actually, they were engaged in salvage archaeology in the cenote, which is soon to be paved over in the continuing development of the island. Recovery of the ceramic artifacts had been authorized by INAH, the National Institute of Anthropology and History. Eventually, government officials flew in from Mexico City with documents proving that the group had permission to remove the artifacts, and the divers were released. Reports in the local press were, as might be expected, rather wild. There are various theories about the arrest, including rivalries between agencies or other groups. Anyway, note that Mexican authorities are very sensitive about the country's archaeological materials. *Source:* R. D. Milhollin, "Incident at Chuu Ha Cenote," *Underwater Speleology*, volume 15, number 4, 1996.

SAN LUIS POTOSÍ

On March 31, 1967, North American cavers made the first descent of the magnificent **Sótano de las Golondrinas**. At that time, the 333-meter drop was the world's deepest. To get to the pit, cavers had to hike uphill 15 kilometers from the town of Aquismón on the Inter-American Highway. Guides and burros were frequently hired to carry gear and long ropes to the pit.

An unattributed news note in the January 1975 *AMCS Activities Letter* 1 noted that a new road was to be built from the town of Pimienta, south of Aquismón on the highway, passing close to Hoya de las Guaguas and continuing north to the town of Tamapatz. The road would be completed in a year. Tamapatz, it noted, "is only a one and one-half hour (level) walk from Sótano de las Golondrinas." The article asked, "Will a road to Tamapatz increase Golondrinas traffic?"

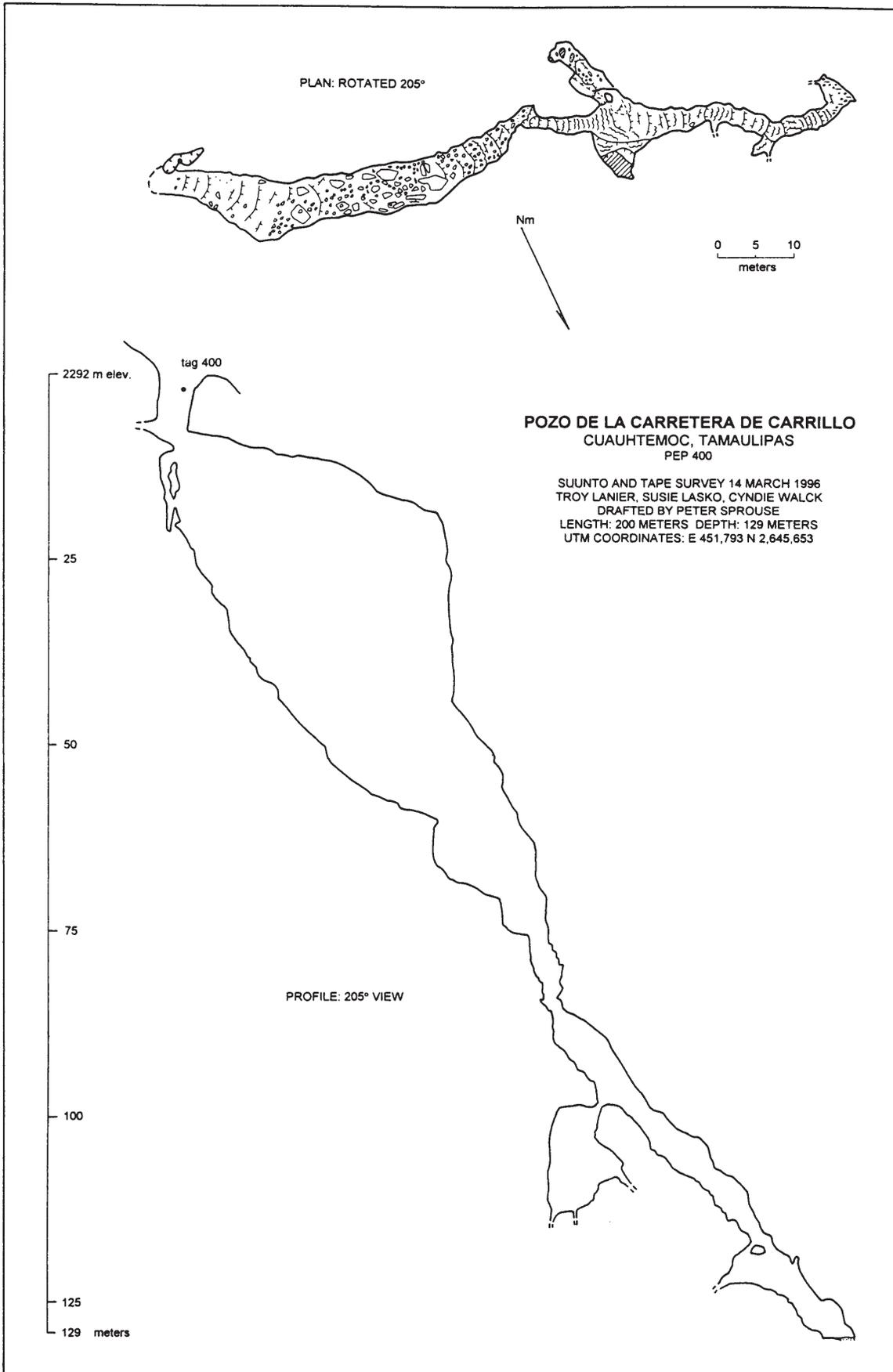
In the 1980s, the road was extended past Tamapatz, above Golondrinas, and northwards for at least 20 additional kilometers. This extension shortened the hike to the pit to a leisurely twenty-minute walk downhill.

In late 1996, almost exactly thirty years after cavers first descended Golondrinas, a new road has been completed from Aquismón directly past Golondrinas, intersecting the old road at La Unión. The drive from the highway to the pit is now only 13 kilometers, easily done by low-clearance, two-wheel-drive vehicles. The remaining "hike" takes less than 10 minutes. The 1975 question can be repeated. How will the pit and the formerly remote mountain area be affected by this new road? *Sources:* Terry Raines, "Speleo Update #2," January 1997; Joe Ivy.

At the beginning of 1997, twenty cavers, mostly from Missouri, visited the **Sierra de El Abra**. They chopped the road to the Otates Mine, which is now passable, and the trail from there to **Sótano de la Cuesta** and **Sótano de la Estrella** is in good shape. They report that they have had some difficulty obtaining permission in Ejido Laguna del Mante to drive up the road. Primo Zarate, the local head, is concerned about other vehicles going up the road without informing him. The New Years trip took two chaperones from the village along, who helped to chop the road and then returned home, apparently convinced that the group was really just crazy cavers. Groups should stop in Laguna del Mante early in the morning and inform Señor Zarate of their plans. Everyone else in Laguna del Mante has been very hospitable. *Source:* Tim Harrison.

SINALOA

According to Reuters, various Mexican news agencies are reporting that a giant bat-like creature is terrorizing a village in the west-coast state of Sinaloa, where goats sucked dry of blood are found dead daily. Poor farmers from the village of Calderón have formed night vigilante squads to track down the flying beast, dubbed the "goat sucker," which has killed dozens of goats and also allegedly attacked one human. Calderón goat farmers have compiled a rough sketch of the bat, which is more than a foot long and has two horn-like prongs



protruding from a hairy head.

This is of course an instance of the common Latin American legend of the *chupacabra*, or goat-sucker. Similar reports have come recently from Puerto Rico, Costa Rica, and El Salvador. Perhaps the legend is related to vampire bats; all three species of true vampires live in Latin America. *Source*: John Pint.

SONORA

Deb Harrison and Linda Duron made a trip across the border to the **Sierra de Pinacate**. The Pinacate volcanic field covers more than 1000 square kilometers, with over four hundred cinder cones. There are nine huge maar volcanoes. Literature from the park mentions that "one of the largest lava tubes, near the base of Carnegie Peak, is a sacred place for the Tohono O'odham Indians (Papago)." Without too much difficulty, they found an area of fumaroles and hornitos on the southeast side of the peak. There were about six fumaroles or collapses at the base of the peak. A couple could only be safely descended with a rope. They were able to enter the largest opening, about 6 meters in diameter, after a 5-meter climb down. The tube continued east and west, with ceilings up to 10 meters high. There was an active hive of bees (not Africanized) making their home in the entrance. The passage to the east quickly ended. In the ceiling, the bees had created a beautiful honeycomb drapery, almost a meter in length. The passage to the west ended in an alluvial plug after about 20 meters. *Source*: Deb Harrison in *Southwestern Cavers*, March-April 1996.

TAMAULIPAS

Numerous expeditions to the Purificación area have been made by cavers of the Proyecto Espeleológico Purificación in the last few years. **Sistema Purificación**, Mexico's longest cave at 89,927 meters [spring 1997], has been pushed during two occupations of Camp II, located some 3 kilometers inside the Infiernillo entrance at the bottom of the system.

The first trip, in March 1994, concentrated on a new complex called No Wasted Space that opened up quite near camp. This is a series of dry, upper-level crawls generally situated over the Isopod River. Nearly 2.5 kilometers was added on this trip.

Two years later, eleven cavers returned to Camp II, and more passages were found in No Wasted Space. Most activity of the 1996 camp was a bit farther south in the system, notably in the vicinity of Arne Saknussemm Borehole. An upward-trending crawl led to a new level, the Grace Kelly Passage, above this complex area. About 800 meters was mapped before leads thinned. There was also a push of the remote Goes II area, even deeper in the cave. Charley Savvas pushed a muddy, descending passage that led to a new river, the River Savage. This is tantalizingly close to a connection with the bottom of the Angel's Staircase passage that comes down from the Brinco entrance high above. Instead of connecting, it degenerated into the death-coral-lined Satan's Love Nest. The expedition netted over 3 kilometers of new survey.

Sistema Purificación was also pushed during several expeditions via the upper entrances, Brinco and Oyamel. Continuing efforts were made to push the remote Dragon River area, which holds promise of connecting with an new upper entrance, **Sótano de la Cuchilla**. The Dragon River had previously been pushed up three climbs. Climbing up five more drops led to the discovery of a horizontal stream passage containing green leaves. Hopes of reaching a new entrance were dashed by a tight sump. Directly above the Dragon River, numerous attempts were made to dig open the bottom of Cuchilla at -175 meters, with only a few meters gained. Surveying in Cuchilla's upper levels brought its length to 1895 meters.

On the higher ridges above the system, many new pits have been explored on recent trips. The deepest of these is **Pozo de la Carretera de Carrillo**, with five drops to a depth of 129 meters. Farther west

near Cerro el Viejo, many new caves were explored in November 1994. Deepest of these was **Cueva de Más Cable**, initially thought to be a blind 12-meter pit. A swing into a window led to four more drops, ending at a depth of 151 meters. A three-day climbing assault on the east face of El Viejo succeeded in gaining access to a large entrance, **Cueva del Machete Volando**. It has some large passage, but ends after only 130 meters.

In the eastern part of the area, the caves around the village of Yerbabuena continued to receive the attention of the PEP. The longest cave in the area, **Sótano de las Calenturas**, had about 500 meters of passage added in two trips during 1995. Efforts continued to tie it into its presumed resurgence, **Cueva del Río Corona**. A dig in Corona led to an upper level via a long, tortuous crawl. Cavers were rewarded with a kilometer of new passage, but no connection. Instead, one passage led almost to the surface, to the underside of a trash-filled sink, where an oil drum blocked the way. A surface survey will be needed to locate the appropriate place to dig on the surface. [A new entrance was dug open here in January 1997.] Lower down the Corona cliffs, a team returned to **Cueva Paraíso Difícil** in April 1996. From a camp near the entrance, a push was made to the back of the cave, netting 473 meters. Continuing leads were elusive, as was the airflow felt at some points along the way.

More detailed reports on the Purificación karst are in the project's newsletter, *The Death Coral Caver*, obtainable from the project at Box 8424, Austin, Texas 78713. *Source*: Peter Sprouse. Maps are from *The Death Coral Caver* 5 and 6, October 1995 and October 1996.

During the week of Thanksgiving in 1996, a large group of cavers from Indiana and the TAG area in the southeastern United States searched the area around El Cielo and Julilo in the **Sierra de Guatemala** for new caves. The area has had plenty of attention in the past, but with little documentation.

Many previously reported caves were visited, as well as a few notable new ones. The best find of the week was **Sótano de los Tres Ojos Verdes** [see article in this issue]. An entrance pitch of 35 meters led to a short slope and the top of another drop. Expecting another short pit, the explorers were excited to find a very deep, exceptionally well decorated shaft, which was bot-tomed and surveyed to be 130 meters deep. Another nice find was **Sótano de San Pablo**, a beautiful open-air shaft of 79 meters. A total of twenty-two caves were explored and documented. *Source:* Gerald Moni.

Sótano de Caracol is located a few kilometers south of Revilla in

the Purificación karst. Since its discovery in 1986, a relatively small group of Texas cavers, including Nancy Weaver, Tom Shope, Bill Russell, and Mark Minton, has been quietly working on the cave. The upper section consists of generally tight canyons connecting more spacious short drops. Progress was halted several times when the pas-sage became too tight, but these barriers fell away to excavation as we followed the persistent draft into the mountain. Finally an im-possibly narrow slot seemed to sig-nal the end, and work on the cave stopped for a period of several years.

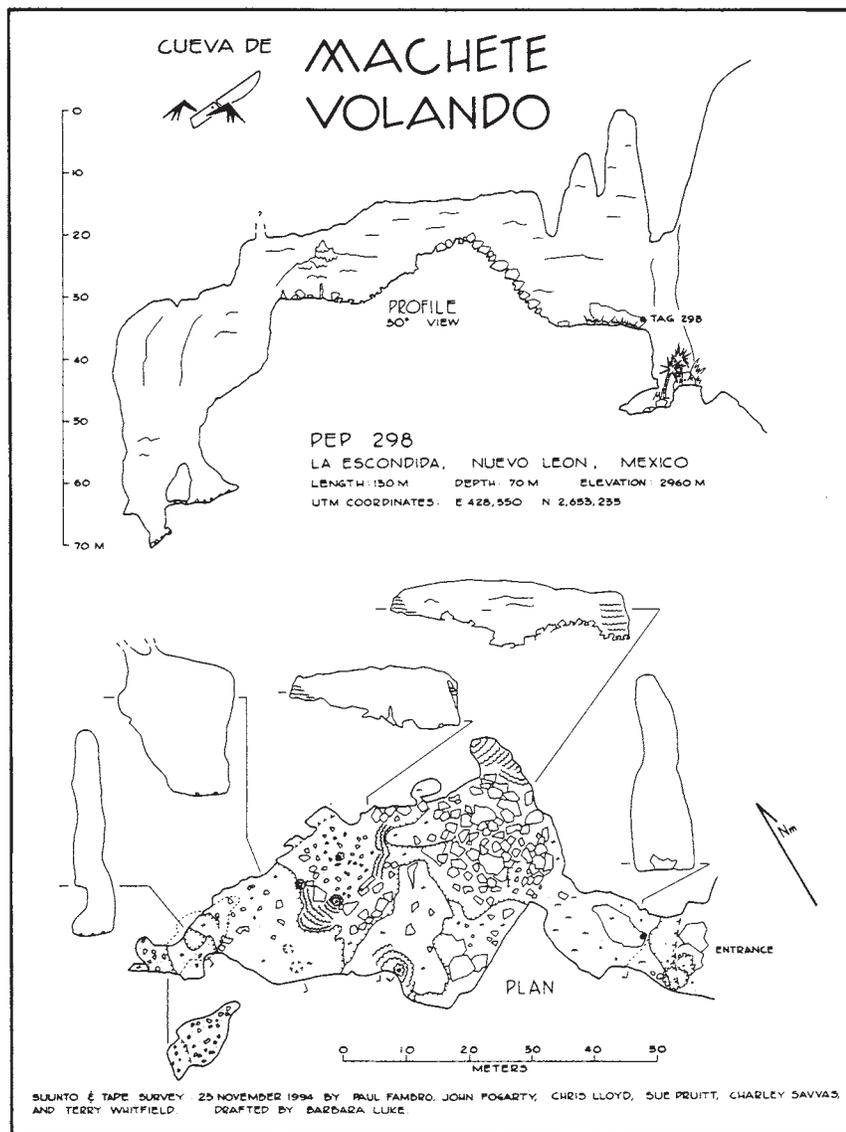
New enlargement technology inspired a return in 1994, and the narrow slot slowly succumbed to

these efforts. Ten meters farther on, the character of the cave changes dramatically, as the canyon inter-sects a major shaft 100 meters deep. More drops below its breakdown floor continue virtually straight down beyond the current limit of exploration, estimated to be about 220 meters below the entrance. A return trip with substantially more rope is planned for later in 1997. *Source:* Mark Minton.

VERACRUZ

When the spring 1995 expedi-tion to Tequila, Veracruz [see ar-ticle in this issue], broke up, the TAG group, Marion Smith, Teresa Williams, Ted Wilson, Doug Strait, and I, Jim Smith, decided to visit the 330-meter-deep **Sótano de Tomasa Kiahua**. Fortunately for us, Peter Sprouse had been approached in Zongolica by a man who wanted a ride to San José de la Inde-pendencia, our destination. The man said that he could help us get permission to do Tomasa Kiahua and find a place to camp that night. He hopped aboard and off we drove, two hours into the night. We passed through many small towns, none of which had a sign. We finally arrived at our destina-tion, and our rider jumped out of the truck and returned in minutes with the *secretaria* of the town. He said we could camp at the **Café Benefecario**, 60 meters from the pit. We drove uphill and pulled in front of a large tin building. The *secretaria* said he would return at 8 A.M. with the *presidente*, and then we would negotiate our stay and permission to do the pit. He said everyone in town was very friendly and that there were no bad people here. Tired and irritable, we parked in front of a bright porch light and tried to settle in for the night. We had finally bedded down, when a young man unlocked the door of the building and turned on the ra-dio at full volume. Welcome to San José! He turned off the radio well past midnight.

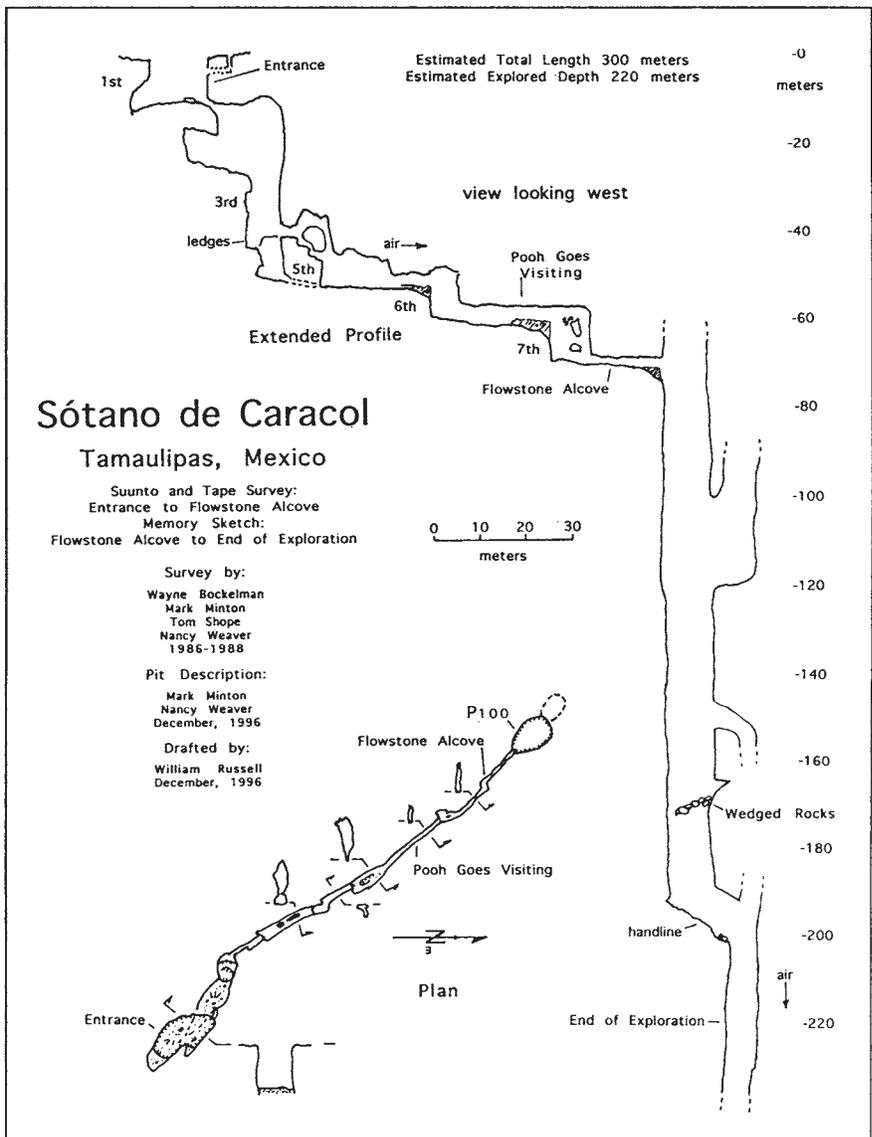
The next morning the *secretaria* and the *presidente* greeted us. I was our de facto *presidente*, and Ted was the Spanish linguist in the group. Ted and the *secretaria* would



converse, and then Ted and I would discuss the conditions for doing the pit. The *secretaria* told Ted that the community needed some financial help to construct a fence around the pit, since it was in the middle of the town. He went on to recount the 1973 demise of a woman who committed suicide by throwing herself into the pit. Apparently that was the only way out of an unhappy marriage. I'll bet she didn't count on falling eleven or twelve seconds before impact. There was no specific asking price to do the pit, and our group decided to pay two hundred pesos *ayuda*. This spoke well of us, and we received a receipt and then signed the town register. Apparently there had been only about ten groups at this jungle pit since 1983. [There is a map of Sótano de Tomasa Kiahua in "A History of Mexican Speleology to 1992" in this issue.]

We hauled two 180-meter ropes and three 30-meter ropes to the vicinity of the shaft. The pit is located only 60 meters from the parking place, over a small hill. At the edge of the jungle depression, we peered across a sinkhole 50 meters in diameter. The opening to the shaft was not apparent, because the 12-meter-diameter shaft is obscured by a heavy jungle of vines, small trees, and elephant-ear plants. The vertical portion of the pit is reached by a tunnel chopped through the canopy. The first 18 meters is a steep slope to an 8-meter sheer drop onto a ledge 2 meters long and 1.6 meters wide that protrudes into the pit. The ledge is actually the top of a large flute. The pit is shaped like a clover-leaf when viewed from 60 meters down.

Doug volunteered to rig the pit. I followed him down to the ledge to help. The lower lip of the pit is where a depth of 330 meters is measured, but adding the top part of the shaft gives a total depth of 348 meters. A small tree on the ledge overhangs the pit. It does not look strong enough to hold a single climber, much less a tandem pair. Doug engineered a rig by drilling a bolt-hole at floor level. A line was anchored to the bolt and tied to the tree. This line was meant to



support the tree and keep it from falling into the pit. The main rig point is a large karst pinnacle on the wall of the pit. This was backed up to the rope on the upper drop. A secondary rig point in a fork in the overhanging tree allowed the rope to hang a half meter from the wall of the pit at its closest. A perfect rig, provided the tree didn't fall into the pit. We tied the two long ropes together and fed 360 meters of rope into the pit. Doug volunteered to descend first.

Peering over the edge of the fluted pit, I could only see down 60 meters, due to a cloud. Despite the apprehension of being on the edge of a thousand-foot drop, I was awestruck at the beauty of the shaft. The walls to a depth of 30 meters

are covered with small ferns. Small ring-necked swifts flew into the shaft and zigzagged to avoid the walls and slow down before landing on their nests. There were no large birds, but a community of small birds lived on the walls. Near the rigging ledge, tiny green, iridescent humming birds darted among the orchid flowers that were the jewels of the shaft. This shaft was outrageously beautiful, and it was worth the whole trip just to peer into the depths Tomasa saw as she plunged to her death.

These thoughts vanishing, I watched Doug looking intently down the shaft as he regulated the speed of his descent. It appeared to be smooth and steady. We had Pat Kambesis's new 180 on top, and it

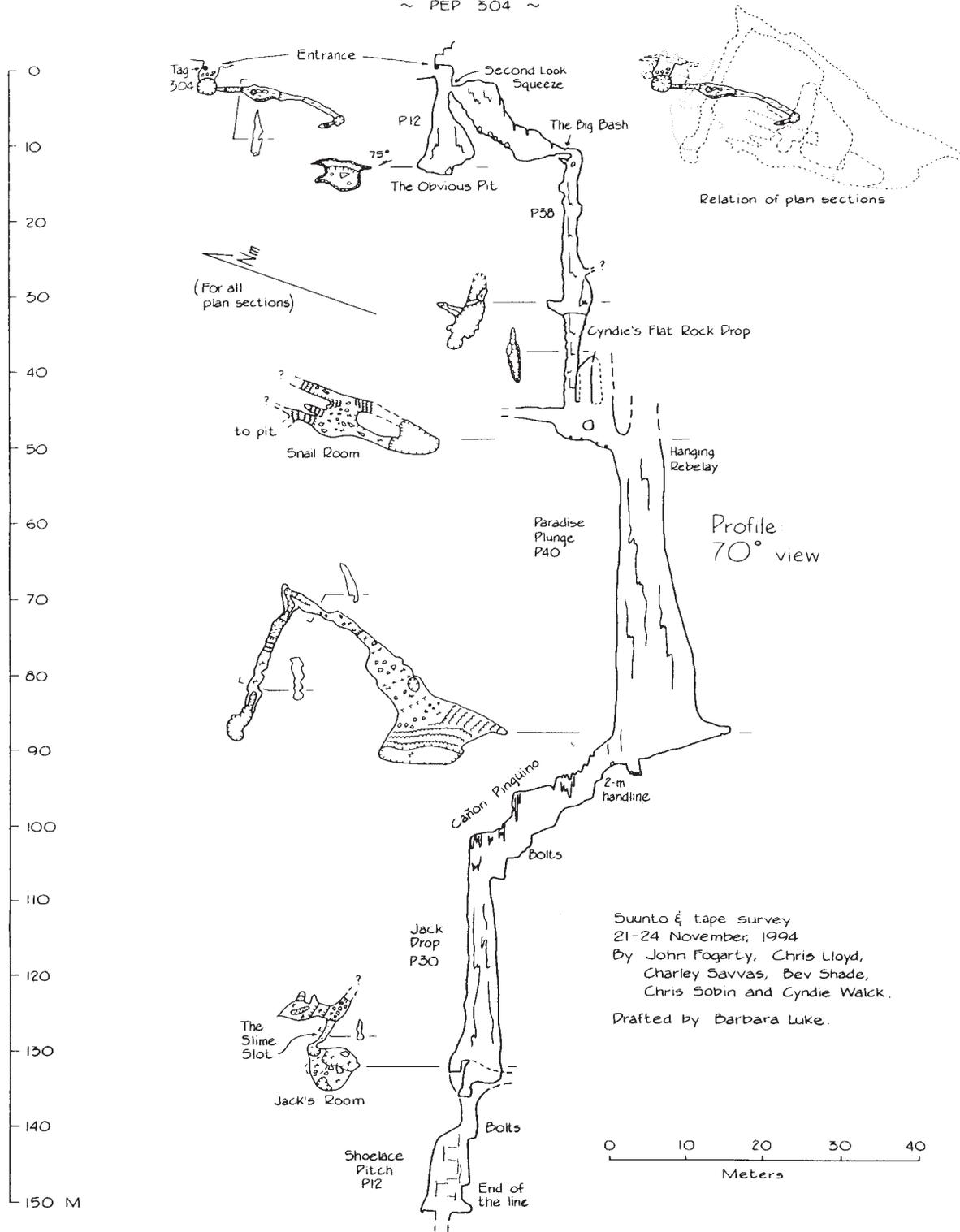
Cueva de Más Cable

La Escondida, Nuevo León, México

UTM Coordinates E 429,810 N 2,652,350

Length: 200 M Depth: 151 M Elevation: 2550 M

~ PEP 304 ~



Suunto & tape survey
 21-24 November, 1994
 By John Fogarty, Chris Lloyd,
 Charley Savvas, Bev Shade,
 Chris Sobin and Cyndie Walck.
 Drafted by Barbara Luke.

proved to give a fast ride. Doug entered the cloud and disappeared. Thirty minutes later, I heard a faint shout from far below. Off rope! Gulp. My turn to ride the snake. I pulled up the heavy rope with one hand and rigged my rack onto it. I checked one last time to make sure my carabiners were locked and swung out into the pit. I sailed down the rope, listening to the sound of the rope against my brake bars and feeling the top bars heat up. Sixty meters down, the wall receded, and I plummeted through a 30-meter-thick cloud. The shaft belled out, then closed in. The only constant was the seemingly endless descent. Finally, at -177 meters, I encountered the knot in the twilight of the shaft. Above me was the gray fog of the cloud, and below me was darkness. I still had 168 meters to go.

Passing the knot was mechanical. I climbed down the rope to weight my rack and continued the descent. I touched the wall about 100 meters below the knot and bounded against the wall the last 60 meters, all the way to the floor. A light was needed to see, despite the 12-meter diameter of the top of the pit. There was very little refuse on the bottom, just a few bones. Did any belong to Tomasa? She had been on the bottom for ten years before her remains were recovered. Doug yelled down from a balcony, and I climbed 8 meters up to him to escape from the rockfall zone. Ted came down next, taking forty minutes to rappel.

The floor of the main pit is actually a wide rampart overlooking a second, 16-meter shaft. There was nothing to tie off to, so I set an 8-millimeter bolt. The rope just reached. We followed a boulder slope for less than 60 meters and climbed down a 2-meter climb. The third drop is 19 meters. I set two 8-millimeter bolts to improve the rigging. A natural rig point is on the floor, but it is terribly awkward to use. Within 50 meters of the last drop the cave ended in a mud sump. There were worms, transparent with a slight iridescent tint, in the small pool. While I was descending, Doug swore he heard

frogs chirping on the bottom of the pit. We never saw any.

We returned to the entrance pit. Doug climbed 15 meters up, then I rigged in and climbed to where I could touch his boot. We took turns ascending and resting, so as to avoid bouncing the rope. Bouncing interferes with the top climber's rhythm and can cause abrasion unless the rigging, like ours, prevents it. I took photos all the way up the pit. Our climb, including passing the knot, took one hour and forty-five minutes. Ted climbed next, in the same time. He was off rope at 5:45 p.m. Marion rappelled next, followed by Teresa. Three hours after they had entered the shaft, they were back on the surface. It took two hours to derig the pit and coil the 450 meters of rope. *Source:* Jim Smith.

Espeleo Veracruz cavers have been exploring caves in the area of Ocoteni on the Veracruz-Oaxaca border. In their base city of Xalapa, they have been rehabilitating **Orchid Cave**, a small lava tube that has been used as a trash dump. They hope to make it a cave park. *Source:* Benjamin Cruz.

ZACATECAS

Over Easter 1996, John and Susy Pint drove to the famed mining town of **Concepción del Oro**, nestled among barren mountains pockmarked with black gaping holes and enormous mounds of slag. They were in search of a smaller, nearby mining town with some unique caves. "These caves are absolutely marvelous," exclaimed a geologist friend of theirs. "The ceilings, the floors, every inch of the walls are covered by crystals. It's as if you had walked into a gigantic geode." The stupendous caves in question were located deep inside silver and gold mines, with no natural entrances, and they were destined to be destroyed in the normal course of the mining operations. With the help of a friend of their friend to secure permission and manage the red tape, they planned to take photos of the caves that might someday prove to be the only record of their existence.

After a long, dusty ride up to the mine on a pseudo-road, complete with 300-meter drop-offs and extremely tight hairpin turns, the group entered the mine. After a bunch of mind-numbing mine passage, they finally came to a low hole in the side of the passage. They stooped over and stepped in. John Pint describes the room:

"The small room shimmered by the light of our lamps. The ceiling and all the walls were pure white, covered in some places with clusters of sharp, pointed, nearly transparent crystals and elsewhere with rounded nodules, creamy-white and often growing tiny 'fingers' near their bases. On a larger scale, these thousands of nodules formed gently rounded 'clouds,' like the sensuous breasts of an underworld goddess. Hundreds of sparkles responded to every movement of our lights.

"The miners had broken into an absolutely stunning fairyland, but they had obviously never heard of the conservationist's golden rule, 'Leave it the way you found it.' Instead, they had chopped away many big hunks of the ceiling and carefully covered the smoother wall with ugly black graffiti. Then they had decided to take advantage of the empty space they had found by filling it up with rubble from their tunnel-making. In fact, we soon discovered that this small room, about 7 by 7 meters in size, was really part of a far bigger cave, most of which was now filled nearly to the top with debris."

In another mine nearby, the cavers were taken to another natural cavity discovered by mining operations. Instead of smooth walls, there was a tangle of stalactites, stalagmites, and columns, colored every possible shade of brown and red. In the first room, all the soda straws and other breakable formations had been snapped off, but they found several crawlways that were very difficult to negotiate, for their floors were covered with crystals as sharp as broken glass. This factor had protected the rooms beyond from damage, and they found areas thick with lovely formations.

As the cavers left the mines, they

realized the paradox these caves represented. Without the mines, no one would ever have been able to enjoy the sight of these caves, nor even know of their existence. But they will soon be utterly destroyed, as the owners continue to develop the mines. *Source:* John Pint.

PROTECTION OF MEXICAN CAVES

Mexico has great potential for the development of speleology and is known world-wide for the caves and sinkholes already found: deep cave systems like Sistema Huautla and Sistema Cheve in Oaxaca, deep cave dives like at Nacimiento del Río Mante in Tamaulipas, and some of the longest vertical drops like Sótano del Barro in Queretaro and Sótano de las Golondrinas in San Luis Potosí. Even though many Mexican caves have been studied in the past century, lots of territory still remains to be explored.

Caverns are unique ecosystems in many ways. Some of the caves' attributes, such as their cultural and historical values, are related to man's use thousands of years ago. Others, like cave biology and geology, derive from the particular

conditions in which they have been formed. Caves are of great social and economic importance, since they are reservoirs of water and minerals. Their environmental conditions have created forms, patterns, and processes exclusive to their rich biology. They have characteristics without parallels in other ecosystems, and we should preserve them.

Establishing a strategy for the protection and correct management of Mexican caves brings us face to face with some problems. There is no existing inventory of explored Mexican caves and their fauna. There is a lack of information on the living resources in the caves. It is necessary to compile general information on the scientific and tourist expeditions in Mexican caves. There are no criteria for assigning priorities and strategies to conserve and manage cave ecosystems and evaluate projected developments of caves and their resources.

In order to coordinate efforts to correct these deficiencies, the Instituto Nacional de Ecología, an organ of the Secretaría de Medio Ambiente Recursos Naturales y Pesca, is creating the Consejo

Consultivo Sobre Cuevas Mexicanas, the objectives of which include defining criteria to guide the management, use, and exploration of Mexican caves and their resources.

Some steps have already been taken to regulate speleological exploration, such as the agreement established between the Unión Mexicana de Agrupaciones Espeleológicas and the Federación de Espeleología de América Latina y el Caribe. They have also begun to analyze the strategies and priorities of cave management and conservation. However, the amount of work requires the participation of all individuals and groups interested in Mexican speleology. Currently, the Consejo Consultivo Sobre Cuevas Mexicanas is including representatives from governmental and non-governmental organizations, and we extend an invitation to all interested to contact the CCSCM, in care of Dr. Rodrigo Medellín, Instituto Nacional de Ecología, Río Elba No. 20, 10th Piso, Col. Cuauhtémoc, C. P. 06500, México, D. F. *Source:* From a notice translated from Spanish by Oscar Berrones.

Peter Sprouse

April 1997

Depth in meters

DEEP PITS OF MEXICO

1	El Sótano (de El Barro)	entrance drop	Querétaro	410
2	Sótano de las Golondrinas	entrance drop	San Luis Potosí	376
3	Sótano de Tomasa Kiahua	entrance drop	Veracruz	330
4	Zacatón	entrance drop	Tamaulipas	329
5	Sótano de Alhuastle	P'tit Quebec	Puebla	329
6	Nita Xongo	Psycho Killer	Oaxaca	310
7	Sótanito de Ahuacatlán	second drop	Querétaro	288
8	Sótano del Arroyo Grande	entrance drop	Chiapas	283
9	Sima Don Juan	entrance drop	Chiapas	278
10	Resumidero del Pozo Blanco	entrance drop	Jalisco	233
11	Sótano del Aire	entrance drop	San Luis Potosí	233
12	Sistema Ocotempa	Pozo Verde	Puebla	221
13	Sótano de los Planos	Puits Tannant	Puebla	220
14	Sótano de Eladio Martínez	entrance drop	Veracruz	220
15	Sótano de Coatimundi	entrance drop	San Luis Potosí	219
16	Sótano de Sendero	entrance drop	San Luis Potosí	217
17	Resumidero de Borbollón	El Tiro Grande	San Luis Potosí	217
18	Sima la Pedrada	entrance drop	Chiapas	217
19	Sima del Chikinibal	entrance drop	Chiapas	214
20	Cueva del Tizar	third drop	San Luis Potosí	212
21	Kijahe Xontjoa	Son On Jan	Oaxaca	210
22	Nacimiento del Río Mante	Macho Pit	Tamaulipas	206
23	Hoya de las Guaguas	entrance drop	San Luis Potosí	202
24	Sistema de la Lucha	entrance drop	Chiapas	200
25	Sistema H3-H4		Puebla	200
26	Kijahe Xontjoa	Lajao Se	Oaxaca	200
27	Sima La Funda	entrance drop	Chiapas	198
28	Sótano de Soyate	entrance drop	San Luis Potosí	195
29	Sótano de Alpupuluca	entrance drop	Veracruz	190
30	Cauhtempa	Pozo Con Carne	Puebla	190
31	Sótano de Tepetlaxtli no. 1	entrance drop	Puebla	190
32	Sótano de Puerto de los Lobos	entrance drop	San Luis Potosí	189
33	Sótano de Hermanos Peligrosos	second drop	Veracruz	186
34	Hoya de la Luz	entrance drop	San Luis Potosí	180
35	Ahuihuitzcapa	entrance drop	Veracruz	180
36	Sima de Veinte Casas	entrance drop	Chiapas	180
37	Sistema Soconusco	Darwin	Chiapas	180
38	Sima del Cedro	entrance drop	Chiapas	175
39	Sótano de la Cuesta	entrance drop	San Luis Potosí	174
40	Sima Dos Puentes	entrance drop	Chiapas	172
41	Sótano de los Monos	entrance drop	San Luis Potosí	171
42	Sótano de Otates	third drop	Tamaulipas	171
43	El Socavón	entrance drop	Querétaro	171
44	Sótano de Tepetlaxtli no. 2	entrance drop	Puebla	170
45	Sótano de los Ladrones	entrance drop	Oaxaca	170
46	Nita Diplodicus	entrance drop	Oaxaca	170
47	Sima Dejar los Debiles a Morir	entrance drop	Chiapas	170
48	Sótano de Agua de Carrizo	Flip Pit	Oaxaca	164
49	OC8	entrance drop	Puebla	160
50	OC4	entrance drop	Puebla	160

LONG CAVES OF MEXICO

Peter Sprouse
 April 1997
 Length in Meters

1	Sistema Purificación	Tamaulipas	89927
2	Nohoch Nah Chich	Quintana Roo	61000
3	Cenote Dos Ojos	Quintana Roo	59000
4	Sistema Huautla	Oaxaca	55953
5	Sistema Cuetzalan	Puebla	34345
6	Cueva del Tecolote	Tamaulipas	32031
7	Kihaje Xontjoa	Oaxaca	25000
8	Sistema Cheve	Oaxaca	23300
9	Coyalatl	Puebla	19000
10	Sistema Naranjal	Quintana Roo	18472
11	Cueva del Río La Venta	Chiapas	12000
12	Cueva del Alpozat	Puebla	11903
13	Atlixicalla	Puebla	11700
14	Sistema San Andrés	Puebla	10903
15	Sistema Soconusco	Chiapas	10574
16	Sistema Pondazul	Quintana Roo	10318
17	Grutas de Rancho Nuevo	Chiapas	10218
18	Cueva del Arroyo Grande	Chiapas	10207
19	El Chorro Grande	Chiapas	9650
20	Sistema Tepetlaxtli	Puebla	9600
21	Cueva Aire Fresco	Chiapas	9346
22	Cueva Quebrada	Quintana Roo	9000
23	Sistema de Tepepa (Niebla)	Puebla	8511
24	Sótano de Las Calenturas	Tamaulipas	8308
25	Sistema de Angel	Puebla	8000
26	Sistema Abejas	Quintana Roo	7965
27	Sumidero Santa Elena	Puebla	7884
28	Cueva Yohualapa	Puebla	7820
29	Cueva de la Peña Colorada	Oaxaca	7793
30	Cueva de Comalapa	Veracruz	7750
31	Actún Kaua	Yucatán	7446
32	Sótano del Arroyo	San Luis Potosí	7200
33	Sistema Perrito	Oaxaca	7148
34	Cueva del Mano	Oaxaca	6798
35	Xongo Dwi Ni	Oaxaca	6500
36	Sistema Zoquiapan	Puebla	6489
37	Sumidero de Jonotla	Puebla	6381
38	Cenote Zapoté	Quintana Roo	6000
39	Sistema Sac Actún	Quintana Roo	5876
40	Gruta del Río Chontalcoatlán	Guerrero	5827
41	Sistema H31-H32-H35	Puebla	5745
42	Gruta del Río San Jerónimo	Guerrero	5600
43	Los Bordos	Chiapas	5211
44	Cueva de Agua Blanca	Tabasco	5200
45	Sima Castor-Sima Grande	Puebla	5100
46	Grutas de Juxtlahuaca	Guerrero	5098
47	Sima Talcómitl	Puebla	5058
48	Veshtucoc	Chiapas	4930
49	Sistema Ocotempa	Puebla	4720
50	Sistema Huayateno	Puebla	4710

Peter Sprouse
 April 1997
 Depth in meters

DEEP CAVES OF MEXICO

1	Sistema Huautla	Oaxaca	1475
2	Sistema Cheve	Oaxaca	1386
3	Kijahe Xontjoa	Oaxaca	1209
4	Akemati	Puebla	1200
5	Sistema Ocotempa	Puebla	1070
6	Akemabis	Puebla	1015
7	Sonconga	Oaxaca	1014
8	Sistema Purificación	Tamaulipas	957
9	Guixani Ndia Kijao	Oaxaca	956
10	Sistema Perrito	Oaxaca	906
11	Nita Cho	Oaxaca	894
12	Sistema de Tepepa (Niebla)	Puebla	850
13	Sótano de Agua de Carrizo	Oaxaca	843
14	Sótano de El Berro	Veracruz	838
15	Sótano de Trinidad	San Luis Potosí	834
16	X'oy Tixa	Oaxaca	813
17	Nita Ka	Oaxaca	760
18	Sistema H31-H32-H35	Puebla	753
19	Sonyance	Oaxaca	745
20	Nita Xonga	Oaxaca	740
21	Yu Nita	Oaxaca	704
22	Aztotempa	Puebla	700
23	Sótano de los Planos	Puebla	694
24	Resumidero el Borbollón	San Luis Potosí	678
25	Sótano de Alfredo	San Luis Potosí	673
26	Sistema Cuetzalan	Puebla	658
27	Sótano de Tilaco	Querétaro	649
28	Nita Nashí	Oaxaca	641
29	Sistema Atlalaquía	Veracruz	623
30	Cueva de Diamante	Tamaulipas	621
31	R'ja Man Kijao	Oaxaca	613
32	Nita He	Oaxaca	594
33	Meadre-Qui-Traverse (CH54)	Puebla	588
34	Sótano de las Coyotas	Guanajuato	581
35	Sótano Arriba Suyo	San Luis Potosí	563
36	Sistema de Angel	Puebla	553
37	Sistema Soconusco	Chiapas	539
38	Sistema Tepetlaxtli	Puebla	535
39	Sótano del Río Iglesia	Oaxaca	531
40	Sótano de Nogal	Querétaro	529
41	Grutas de Rancho Nuevo	Chiapas	520
42	Sótano de Ahuihuitzcapa	Veracruz	515
43	Sótano de las Golondrinas	San Luis Potosí	512
44	Hoya de las Conchas	Querétaro	508
45	Sótano del Buque	Querétaro	506
46	Pozo de Montemayor	Nuevo León	501
47	Nita Chaki	Oaxaca	493
48	Hoya de las Guaguas	San Luis Potosí	478
49	Sistema San Andrés	Puebla	474
50	Nita Terremoto	Oaxaca	470

ARTICLES



A HISTORY OF MEXICAN SPELEOLOGY TO 1992

William C. Stone and Terry Raines

This article was written for the October 1992 Conference on Latin American Speleology in Vinales, Cuba. The proceedings of that conference have, unfortunately, never been published. The material in the original paper on the exploration of the Sistema Huautla, Oaxaca, formed the basis of "History of Exploration in Sistema Huautla" in AMCS Activities Newsletter 21 (1995), which should be read in conjunction with this version, from which most of the Huautla material has been deleted. Other than updating a few length and depth statistics, no effort has been made to extend the coverage beyond 1992. The bibliography and references to it have been added by Bill Mixon.

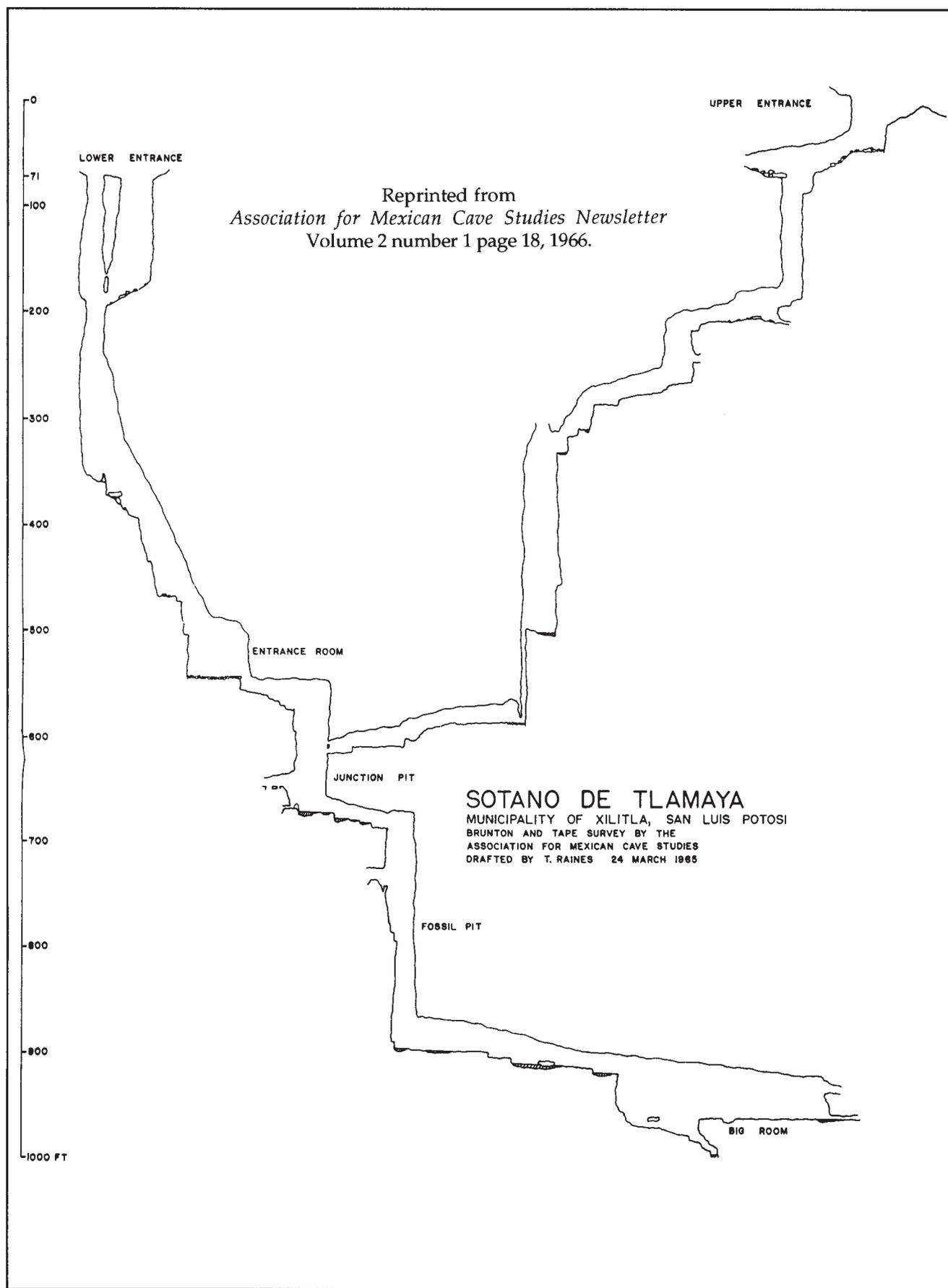
Mexico possesses an extremely diverse geography that includes vast deserts in its northwest, a dry central plateau bordered on the west by the Sierra Madre Occidental and on the east by the Sierra Madre Oriental, and a lush tropical lowland that extends east of the Sierra Madre Oriental and on into the Yucatan Peninsula. The east side of the Sierra Madre Oriental receives very high annual rainfall, up to five meters per year, as humid air is swept westward from the Gulf of Mexico and pushed into the cooler, higher elevations. This particular range, which extends the entire length of the east coast of Mexico and into the southern state of Chiapas, is known to have extensive limestone deposits as much as one kilometer in thickness. In many places the strata have been thrust upward to mean elevations of two thousand meters, and to elevations of three thousand meters in several locations. These condi-

tions have given rise to the formation of extremely deep caverns. At some particular sites, the potential for extensive integrated systems with significant horizontal extent has been realized, but in general it is the vertical extent that distinguishes Mexican caves on the world scale.

In 1980, if someone had asked that a history of cave exploration in Mexico be written, it would have been a simple task. Then, most if not all of the significant work had been undertaken by a handful of individuals from the Association for Mexican Cave Studies, a loose-knit group of explorers from across the United States, but mostly based in Texas or with roots in Texas. It was a small group, generally composed of college-age individuals with an athletic bent who were attracted to world-class vertical caving. Everyone knew what everyone else was doing; indeed, each spring would witness a diverse group of expedition teams carrying out their final organization in Austin, Texas, where they could get the latest scoop on what was going on south of the border. Later, these same teams would return through Austin to report their findings to their peers. Austin became the unofficial hub of the Western Hemisphere deep-caving world. The drive and enthusiasm of these groups ultimately led to the founding of the Association for Mexican Cave Studies and a newsletter bearing the same name. This journal and its descendants still remain the pre-eminent authority on karst studies in Mexico.

Until the early 1980s, Mexico was known to the world chiefly for its

spectacular open-air pits, the Sótano de las Golondrinas, with its 376-meter free drop, still considered by many the world's most awesome pit, and the gigantic El Sótano del Barro, with its 410-meter drop. Even though these were discovered in 1968 and 1972, respectively, they attracted primarily curiosity seekers, not explorers, to Mexico. It was a singular event in the spring of 1980 that changed all that: the linking of Li Nita with the Sótano de San Agustín on the Huautla Plateau to form Sistema Huautla, the first cave in the Western Hemisphere to crack the one-kilometer depth barrier. News of this discovery rippled not only through the country of Mexico, where a small but growing number of exploration groups were then developing, but around the world. Each year thereafter, the number of international expeditions to Mexico increased, first from Australia and Belgium, then from France, Great Britain, Italy, and Canadian Quebec. In the spring of 1991, during the prime dry season from February through May, more than a dozen major, multi-month expeditions were being fielded in widely scattered regions throughout Mexico. The explosive expansion in expedition caving in Mexico is marked by the growth in known caves surpassing the world-class standard of 500 meters depth. In 1968 there were only two such caves in Mexico, Sótano de San Agustín, 612 meters, and Sótano del Río Iglesia, 535 meters. By the spring of 1995 there were forty-five caves deeper than five hundred meters; six of these are deeper than 1000 meters. Today, Mexico is recognized



as one of the premier sites in the world for deep-cave exploration, and there are many who believe that within the next ten years the first two-thousand-meter-deep system will be found in the southern Sierra Madre Oriental.

In what follows, we attempt to summarize the substance of countless man-years of speleological exploration that have been invested in Mexico during the past half century. In the process of this compression of what would (and in fact has) filled entire volumes, we were forced to select only those discoveries that, at the time of their undertaking, were especially significant. As techniques and skills have progressed substantially since the initial work, some later discoveries that would have been remarkable accomplishments twenty years ago had to be omitted in the interests of brevity, and we apologize in advance to those who may feel slighted by our selection process.

The caves of Mexico have attracted special interest ever since the first humans arrived on the continent. For thousands of years, they were primarily considered useful places, where the shelter of the rock provided an area suitable for living, storage, entertainment, or rituals, or a place where minerals, fertilizer, clay, honey, or water could be collected.

Following on the heels of Hernán Cortés, naturalists from Europe began studying the archaeology that Mexican caves contained and the animal life that crawled within them. Emphasis was on the archaeology, and many fine artifacts were exported to foreign countries prior to the establishment of the modern archaeological statutes in Mexico. But by 1936, biological attention was focused on Mexican caves, where blind fish had been found in both Yucatán and San Luis Potosí. The study of these fish and other biospeleological studies [1] attracted such gentlemen as Charles E. Mohr. He made note of the obvious caves along his routes, and, in anticipation of the First International Congress of Speleological

Societies held in Monterrey in 1950, he wrote a special supplement on the caves of Mexico for the April *NSS News*.

The first man on the scene who could be called a speleologist in the modern sense of the word was Federico Bonet, who evidently enjoyed describing and mapping caves and writing reports on the areas he studied. Born in Spain in 1906, he migrated to Mexico in 1939 and became head of the Department of Zoology at the Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, in Mexico City. Although drawn to the caves because of his career as a biologist and geologist, he began describing the caves themselves in his 1953 publications "Datos sobre las cavernas y otros fenómenos erosivos de las calizas de la Sierra del Abra" and "Cuevas de la Sierra Madre Oriental en la región de Xilitla," which contain cave maps and detailed descriptions. Later, in 1971, his outstanding bulletin *Espeleología de la región de Caca-huamilpa, Gro.* was published. [2]

Following Bonet in the 1950s, and perhaps as a result of publicity associated with the international meeting, cave explorers who were not scientists began traveling to Mexico in hopes of high adventure. One group of cavers from the eastern United States found more than they expected during exploration of the Boca del Diablo, Taxco, as reported in the November 1957 *NSS News*. Another group, from Texas, began exploring the big known caves along the Inter-American Highway and descended a pit described in the 1950 *NSS News* supplement as "the pit and beyond seems impossible" to explore. These were significant accomplishments, since at the time the explorer was either lowered down and hauled out, or prusiked down and then back up on 16-millimeter manila rope.

One of the earliest great adventures in Mexican vertical caving began when Robert Mitchell, Francis Abernethy, and Tom Hayes traveled to San Luis Potosí in the summer of 1958 searching for tree ferns in the cloud forests

above Xilitla. In addition to being shown ferns, they were led to the great entrance to Sótano de Huitzmozotitla. Rocks fell free for seven seconds, and they promptly decided that some day they would make every effort to descend the pit. Indeed they did, some two years later, in an epic of hand winches, telephone lines, and safety lines. The drop proved to be 111 meters, immediately followed by another deep drop [3]. This adventure led not only to the exploration of this cave, but also the discovery of nearby Sótano de Tlamaya, which for a time became the deepest known cave in the Americas.

The other significant caving event of 1960 was the Texas Region Project at Gruta del Palmito, Bustamante, Nuevo León. The cave had become known in March of that year to M.C. Doyle of the Alamo Grotto, and a project to map the cave was organized. Word of the cave's magnificence was spread throughout Texas by all who attended.

With Mexico's reputation for great caves quickly growing, the year 1962 was to be a turning point. Thomas "TR" Evans, who had been an active Texas caver for several years, graduated from college and ventured to Veracruz in hopes of a European voyage. When those plans fell through, TR returned inland to Orizaba and began looking for caves. Near the Indian village of Tequila, Veracruz, he discovered not only one or two, but tens of pits, locally termed sótanos, that were very deep. In addition, entire valleys were found to abruptly end and their rivers to disappear into caves. A month elapsed before TR made his way home to Austin, but still a vivid memory of Tequila's deep pits was fresh in his mind [4]. He found it not at all difficult to excite fellow cavers at the University of Texas. They were more than willing to quit school and head south.

TR organized the first Speleological Survey of Mexico trip, which included TR Evans, Bill Russell, James Reddell, and Terry Raines.

The pits explored around Tequila proved to be 100 to 120 meters deep. They were quite a challenge, since at that time the deepest pits in Texas were about 30 meters deep and were descended using cable ladders and a belay line. Tequila was one of the first proving grounds for what is known today as single-rope techniques[5].

Over the next decade TR Evans organized the Speleological Survey of Mexico into a publishing organization, renamed the Association for Mexican Cave Studies, and explored into many new caving areas in Mexico. In 1966 he discovered, among others, Sótano de las Golondrinas and Hoya de las Guaguas in the mountains west of Aquismón, San Luis Potosí. He made the first descent of the 333-meter drop at Golondrinas the following year. (The high-side drop is 376 meters free.) For his initiation of the organized study of Mexican caves he likely will be remembered as the Father of Mexican Speleology.

From 1962 to 1965, trips left out of Austin whenever there was a holiday break at the University of Texas. The UT Speleological Society met, as it still does, on the first and third Wednesdays of every month, and it was at these meetings that exploration results were presented and future trips planned. During these years, single-rope techniques were continually being improved, as the caves discovered became deeper.

The discoveries made in 1962 by Evans, Russell, Reddell, and Raines were pushed extensively in 1963. The Tequila area produced deep, single-drop pits up to 122 meters deep and vertical systems up to 213 meters deep. In Xilitla, the first underground camp in Mexico was set in Sótano de Huitzmolotitla. Bill Bell, Tommy Phillips, Terry Plemons, and Terry Raines spent 106 hours underground and finished exploration and survey to a depth of 241 meters and a length of about 3 kilometers. Also, on 6 February 1963, TR published a brief checklist of known caves, followed six days later by the *SSM First Report on the Caves of Mexico*, which listed information on 130 caves, exclusive of

the Yucatan Peninsula. About 110 of these were previously known caves, and 20 were caves located by original field work prior to February 1963. The information on previously known caves came from three principal sources: Federico Bonet's articles on Mexican caves, D.C. Carter, at that time a Texas A&M Department of Wildlife Management researcher who had visited numerous Mexican caves in connection with his bat research, and Carroll Slemaker, who, with the help of Bonet, had compiled a list of Mexican caves in about 1956. These sources, combined with the several books on caves of the Yucatan Peninsula and other published references, gave a total of approximately 210 Mexican caves on which some information was available prior to 1963.

The year 1964 proved to be a year of firsts. On a whirlwind trip back down to Tequila, Veracruz, Bill Bell and Terry Raines were asked to recover the body of a kind professor who had been thrown down a 100-meter sótano. That was the first time cavers had ever been asked to perform this type of service in Mexico. Then, on the return trip, Bill and Terry descended the skylight in Ventana Jabalí, Tamaulipas, and measured it to be 153 meters. This broke the United States monopoly forever on depth records in the Western Hemisphere, giving Mexico the longest free drop in the Americas; the previous record had been 130-meter Surprise Pit in Alabama. Later that year, AMCS cavers were shown the entrance to Tlamaya, across the ridge from Huitzmolotitla, that had been previously recorded by Mitchell. On the third trip back to this cave, in November 1964, Benny Martin, Robert Burnett, Bill Bell, and Terry Raines surveyed to a depth of 391 meters, making Tlamaya the deepest cave in the Americas. Another first of this year, and an event that would change the flavor of caving everywhere, was the arrival of the first Jumar ascenders. They were immediately used in the exploration of Tlamaya [6]. Also in 1964, the annual convention of the National Speleological Society was held in Texas, and

news of the Mexican discoveries was enthusiastically received. Trips began pushing into new areas in the Sierra Madre Oriental and south of Mexico City.

In 1965, other great caving areas were discovered. May of that year found David McKenzie, Orion Knox, and John Fish hiking into the Sierra de Guatemala, Tamaulipas, and rigging the Sótano de la Joya de Salas [7]. This proved to be one of the great caves of the time, ultimately reaching a depth of 376 meters. Then, in July, following leads from a topographic map indicating limestone with sinkholes, John Kreidler, Tommy McGarrigle, and Bill Russell first started locating caves in the Huautla, Oaxaca, area. In one dolina they found Sótano de San Agustín, which over the years would be explored to a depth of over one thousand meters.

In 1966, attention was focussed on two areas: in the south, the newly discovered Huautla area, and, in the north, the masses of limestone to the north and west of Xilitla. On 6 June, Bob Burnett, Charlie Jannings, Ed Alexander, and Tommy McGarrigle first entered the Sótano de San Agustín and explored through the Sala Grande and down a series of small drops. Then, during the last days of the year, Tom Tracy, Ed Alexander, Tommy McGarrigle, and Terry Raines returned to San Agustín and began the survey, reaching a depth of 281 meters and the top of a deep shaft taking water. Simultaneously, TR Evans, Charles Borland, and Ronald Stearns were pushing into a new area north of Xilitla and west of Aquismón, and they were led to the entrances to Sótano de las Golondrinas and Hoya de las Guaguas.

The stage was set for the first two major expeditions to Mexico, with destinations of San Agustín and Golondrinas. Both projects were fielded in the first days of April. The twelve members of the San Agustín team quickly rigged down to the end of previous exploration and found water levels too

high to continue. In contrast, the team of twelve cavers led by TR Evans had great success in rigging Golondrinas and putting the first living person on the floor of the cave. The drop was measured at 326 meters, and during the course of the expedition eight cavers descended and returned to the surface [8]. To this day, Sótano de las Golondrinas remains what many consider the most magnificent pit on the planet. Later, in June 1967, the cave was accurately surveyed, correcting the depth of the low-side drop to 333 meters.

The following spring, the impressive Hoya de las Guaguas, some 8 kilometers south of Golondrinas, was explored to a depth of 450 meters at the bottom of a massive second chamber. The cave consists entirely of two giant offset rooms, and the cave may be explored to the bottom without lights. The high-side rig on the entrance pitch was measured in 1978 at 202 meters free, while a second pitch of 153 meters could be rigged along the south wall into the second chamber. During the first exploration of the second chamber, problems arising from a local jurisdictional dispute between the towns of Aquismón and Tampaxal led to the arrest of Jonathan Davis and Ron Ralph at the edge of the pit shortly after they had climbed out. To their utter dismay, they were forced at gunpoint to immediately derig the shaft. This would have been a minor problem were it not for the fact that their teammates, John Fish and Richard Smith, were still on the bottom. Imagine their consternation on seeing the rope hoisted out without any communication from the top. The situation was resolved some six hours later, and a rope was lowered back into the hole to rescue Fish and Smith, who made record time on their ascents [9].

The summer of 1967 saw the publication of the first AMCS bulletin, *Caves of the Inter-American Highway* [10]. In the Xilitla area, Sótano de La Silleta was explored to -221 meters. Christmas of this year found Canadian cavers joining forces with the Texas cavers in the Huautla area, pushing deeper into

San Agustín and exploring a new cave called Sótano del Río Iglesia. Río Iglesia was surveyed to a depth of 535 meters, making it not only the deepest in the Americas, but also the first Mexican cave to crack the 500-meter measure that delineates the class of very deep caves. San Agustín, however, continued, and it was not until the following Christmas of 1968 that a sump, then considered the bottom, was reached at a depth of 612 meters.

The last two years of the sixties saw work continuing in all the major limestone areas north of Mexico City, with cavers hiking greater distances to reach the caves. By now the road from the border to Cd. Valles was well known, and the first line of one trip report even states, "If you desire the details of our drive from Austin to Cd. Valles, read the last fifty trip reports. . . . It's all there." Hiking in the area above Ahuacatlán, Querétaro, revealed several unusual caves. The first was Sotanito de Ahuacatlán. The small entrance drop was only 22 meters, but a small hole in the far side of the first room seemed to descend forever. It was finally bottomed in March 1971 by Blake Harrison and Terry Raines. The survey showed it to be a phenomenal 288 meters deep [11]. Photos from this era show Harrison on the bottom of the pit with a 3-meter-high snarl of twisted Goldline, because they had lowered nearly five hundred meters down the shaft. Kernmantle ropes, such as Blue Water and PMI, were only beginning to see use by the caving community at this time.

In late January 1972, two AMCS cavers, Craig Bittinger and Logan McNatt, were hiking in the mountains of Querétaro in the area north of Ahuacatlán when a local villager called to their attention a white spot on a distant mountain. Through binoculars they could see the curved side of the entrance of what they knew must be a large pit. They could not have imagined at that time just how huge it would prove to be, for it was more than 30 kilometers away. An epic hike ensued, the last portion of which was

guided by Ramón Rodríguez, the son of the village jefe of Rancho El Barro. Bittinger describes what followed: "We suddenly burst through the jungle and there in front of us was the largest pit either one of us had ever seen. We quickly picked up a rock and threw it into the pit. After what seemed like an interminable wait [actually 13.5 seconds], we heard a tremendous noise from below. . . . Ramon was totally mystified as to why these two crazy gringos were jumping up and down, screaming and excitedly shaking hands. . . . Our conversations kept centering on the pit and how we were going to break the news to the people back in Austin." The return expedition was not long coming, and the drop was measured with a stainless-steel wire at 410 meters, thus sparking a debate that has persisted ever since regarding the title of world's deepest pit [12]. The French clearly favor the averting of one's eyes from the presence of substantial ledges in determining what constitutes a single pit. Courbon's 1986 *Atlas des grandes cavités mondiales* places no fewer than three pits, Hollenhöhle in Austria, Minye in New Guinea, and Provatina in Greece, ahead of El Sótano, despite the fact that none of these can be categorized as sheer. Interestingly, when the subject is further refined to that of a totally free shaft, even the French have admiringly labeled Golondrinas the queen of pits.

In the early 1970, the advent of hostilities with the local people in the Huautla area encouraged energies to be refocused on northern Mexico. Aerial reconnaissance of the Sierra de El Abra, Bonet's original hunting ground, had revealed an amazing carpet of jungle pocked with giant black holes [13]. The mystery of these features drove teams of cavers to chop for days through dense thorn-scrub jungle thick with stinging nettles and fer-de-lance snakes. Perhaps the best known of the black-hole searches went in January 1973 from the highway between Mante and Valles. A team consisting of Peter Strickland, Logan McNatt, and others chopped a trail eastward for some

8 kilometers on a compass bearing before reaching the western crest of the Sierra de El Abra. Using Cueva Tanchipa, which they discovered on the ridge, for their basecamp, they chopped an additional 3 kilometers before finding Sótano de la Estrella, an 80-meter-deep pit perhaps 50 meters in diameter that contained a large population of military macaws. Just a short distance further north, however, was the big find, Sótano de la Cuesta, a gigantic chamber with a volume of nearly fifteen million cubic meters. The route in was a 174-meter freefall through a large pit that suddenly opens into black space as far as the eye can see in any direction. Although not the deepest single shaft in the Sierra de El Abra (Sótano de los Coatimundis, 219 meters, holds that distinction), it is surely the most spectacular.

In the summer of 1969, Bill Russell had been hiking in the remote La Parada valley west of Golondrinas in the Sierra Madre Oriental. There he heard rumors of a giant tunnel known as El Socavón in the mountains to the west. Short on time, he filed the lead. Five years later, he related this rumor to two young cavers from the eastern United States, Bill Stone and Steve Ward. These two subsequently began a ten-day trek in August 1974 from the village of Tancoyol, Querétaro, on the western side of the range. Having run out of food on the seventh day, but with growing conviction that they were on the trail of El Socavón, they continued on, ultimately locating the verdant funnel at the end of a mist-filled half-kilometer-long dolina. The shaft was more than 80 meters in diameter, and their 120 meters of rope only left them swinging from a knot at its end in the yawning blackness of a massive chamber. There had been a lack of "going" deep leads during the previous year, and so word of El Socavón spread. December of the same year saw a twenty-three-strong force headed east from Tancoyol, equipped with 1800 meters of rope loaded on ten burros. Unfortunately, a world depth record was

not forthcoming; the entrance shaft proved to be only 189 meters, ending in a 200-meter-diameter chamber [14].

In August of 1975, Stone and Ward were again in the mountains near Tancoyol. Following five weeks of scouting and a marathon 45-kilometer hike north of the town of Saucillo, they were shown the Sótano de Jabalí on the southern edge of the San Juan Plateau. Rocks dropped down its entrance bounced for 10 seconds. A return trip some three months later showed Jabalí to be 308 meters deep. Further scouting to the north by Tracy Johnson on this same expedition led to the discovery of Joya de las Conchas, an unassuming swallet at the confluence of four arroyos, and the rumor of an even deeper pit to the north, known as the Sótano de Nogal. Conchas was ultimately bottomed during the spring of 1976 by a thirty-seven-member team at a depth of 508 meters, the first cave in Mexico to have broken the five-hundred-meter mark in six years. Later, in May 1976, Sótano de Nogal, first located by Roy Jameson during the Conchas expedition, was explored to its end at -529 meters. Many individuals, including Stone, Bill Steele, Steve Zeman, Jim Smith, Peter Sprouse, and Terri Treacy, who were later to play leading roles in the major projects of the 1980s, were drawn together by the San Juan explorations [15].

In December 1975, a rare opportunity occurred when pilot Bob Stucklin made his plane available for reconnaissance flights over the Sierra de El Abra and the Xilitla Plateau, far above the lowlands originally investigated by Bonet. The most impressive discovery resulting from these flights was the Hoya de la Luz on the northern face of the Xilitla Plateau, a 188-meter freefall shaft with an entrance measuring 200 by 300 meters. Luz was ultimately reached on foot by Stone, Larry O'Loan, and Gary Stiles in May 1976 and bottomed in June of that year. Situated at an elevation of three thousand meters, the pit is surrounded by a forest of pine trees, while its floor is popu-

lated by 30-meter-tall deciduous trees [16].

In the spring of 1976, Charles Fromen, Jean Ubico, and a team from Houston, Texas, were scouting the highlands west of Ciudad Victoria, Tamaulipas, following in the footsteps of Austin caver David McKenzie, who had, two years earlier, located an obscure cave named Cueva del Brinco at the top of the mountain near the logging village of Conrado Castillo. Fromen's team had met an old gentleman named Antonio Grimaldo, who informed them of a large cavern located in the side of the mountain at the head of an arroyo. Ubico later wrote: "The inexhaustible 78-year-old señor macheted down vines and limbs to clear the semblance of a trail for us through the thick jungle vegetation. Huge boulders blanketed with slippery moss formed an obstacle-course along the river bed that winds through the canyon. And then we came upon it: an enormous, black cave mouth some 35 meters straight up the face of the cliff. During the rainy season a giant waterfall cascades out of the entrance down to the river below. The señor had once shown the cave site to some American tourists who merely took pictures; our crew began immediate plans for entry." Fromen's team had found Cueva de Infiernillo, a giant cave system extending north under the mountain [17].

Early in these explorations two individuals became involved who would later forge the disparate efforts of many groups into a concerted project. It was Peter Sprouse, a native Virginian who had moved to Austin in the early 1970s, who first realized the potential for the area at the headwaters of the Río Purificación. During November 1976, a team led by Sprouse and Terri Treacy reached a depth of 162 meters in Cueva del Brinco at a distance of some 2 kilometers from the entrance [18]. By this time, the Cueva de Infiernillo, although some 4 kilometers distant from Brinco, was known to be heading north toward Brinco and rising up through the mountain below the

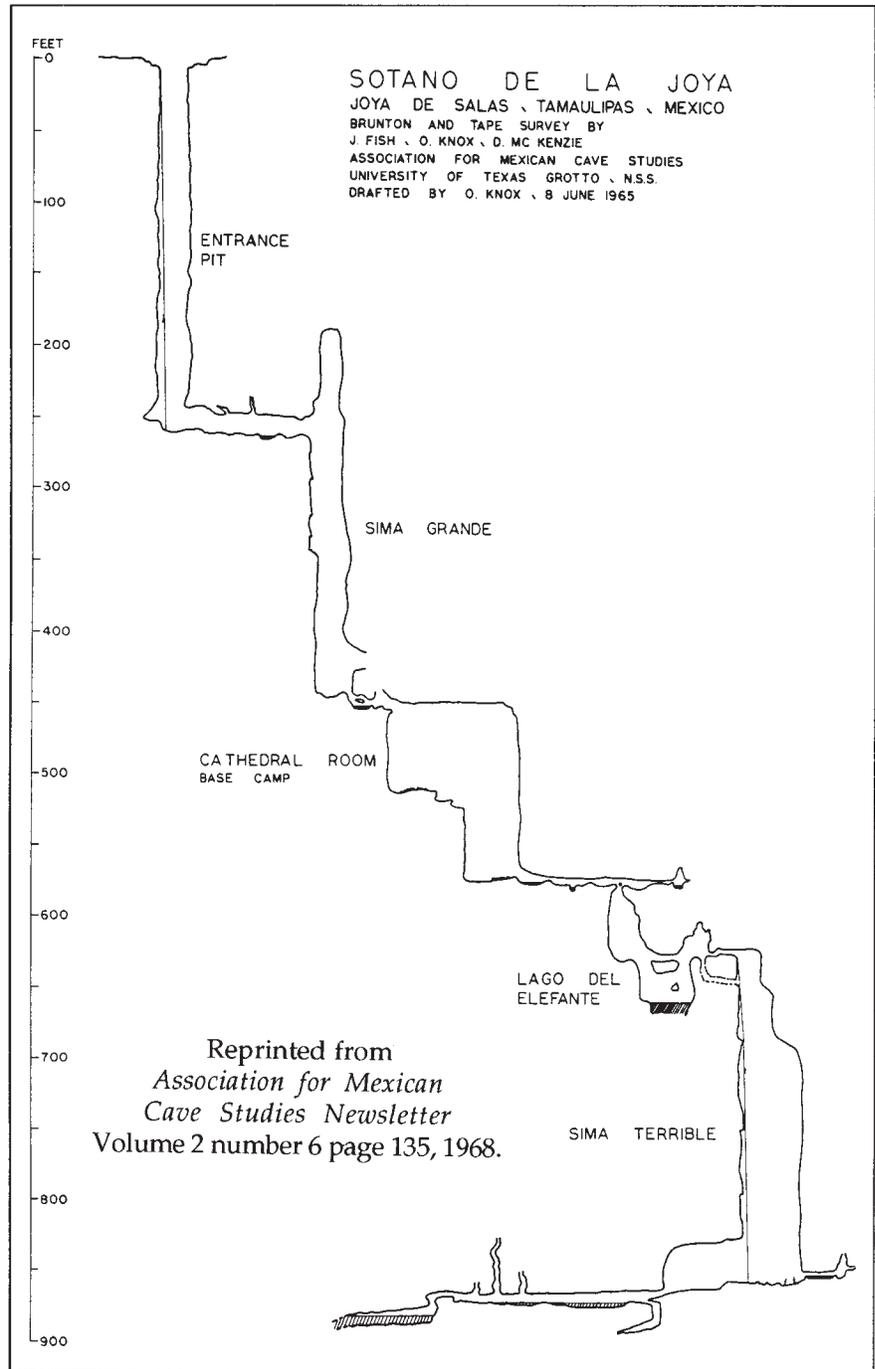
deepest known point in Brinco. In the summer of 1977, Sprouse postulated the link between the two caves, with a depth potential of nearly 900 meters and the possibility of a grand integrated cave system extending some 40 kilometers to the south, to the limits of the known karst [19]. The formal pursuit of these goals soon became known as the Proyecto Espeleológico Purificación. It was the first of three major projects that would attract the best talents during the next decade.

From another standpoint, an equally important milestone from this era was the development by David McKenzie of the computer program Ellipse, which became the standard of the Mexican caving community. The general acceptance of this program permitted the maintenance of digital databases from all the major projects at one central location at the University of Texas at Austin. The key features of Ellipse were subsequently incorporated into the PC-computer program Cave View, which is now seeing wide use.

Although not a record deep or long cave, the Sótano de Sauz, located just south of Big Bend, Texas, in the Mexican state of Chihuahua, is worthy of note for its unusually high temperature, 41°C (106°F). The cave was explored by Gill Ediger, Steve Zeman, Peter Sprouse, Terry Sayther, and others in the autumn of 1975, and it was found to be 1.4 kilometers long and 220 meters deep. The cave ends in a 30-meter-diameter tunnel that continues on a steady slope for nearly 800 meters. Throughout this chamber are hundreds of dead bats. Blocks of ice were carried in the cavers' backpacks to help combat the heat [20].

At the same time as the initial explorations in the Purificación area, Richard Schreiber led the first return to the Huautla area after the moratorium in exploration at the end of the sixties.

One of the most significant technical expeditions of 1977 was the return to the Sumidero Yochib in the southern state of Chiapas. This magnificent river swallet, near



the city of San Cristóbal de las Casas, had been located in January 1974 by Canadians Joan Beckett and Mike Boon, although numerous groups had heard of its existence up to three years earlier. Yochib's principal distinguishing feature is the amount of water, more than a cubic meter per second, that thunders down its sinuous passages. By 1977, the stories of endless "bolt ladders" (horizontal traverses on blank walls to avoid the force of

the water), hundreds of meters of canal lines, and noise so loud that it was nearly impossible to communicate had drawn the interest of Bill Steele, Blake Harrison, Mike Van Note, and Jim Smith, among others, to join Boon in his mad scheme to bottom Yochib. During the course of the expedition, two near-drownings occurred. In one gripping incident, a non-locking carabiner that had been used to rig a cable ladder unexpectedly

unclipped, leaving a hapless Norm Pace holding the end of a loose ladder in a fast-moving river just above a falls. A slack backup rope happened to be attached to this, and the system ultimately snapped taut with Pace hanging over the lip of the shaft and under the full force of the water. After nearly ten minutes, his teammates, sure the worst had happened, cut the rigging free to recover the body. To their amazement, Pace stumbled to the shore below, having managed to create some breathing space under the brim of his helmet. Ultimately, Yochib was bottomed in a 60-meter-diameter chamber, where the river disappeared into a sump at a depth of 206 meters. More than a kilometer of rope had been rigged to reach this depth, making Yochib meter-for-meter one of the most technical caves in the world. The resurgence to Yochib's water is presumed to lie at Cruz Pilal, some 2 kilometers distant and 100 meters lower than the present sump. The complete traverse of the Yochib system thus lies in wait for ambitious cave divers [21].

During 1977, Sótano de San Agustín was pushed to its bottom at the -861-meter sump, Huautla's La Grieta was pushed to -760 meters, and Sótano de Agua de Carrizo in the same area was pushed to -778 meters. The exploration of two new 700-plus-meter-deep caves during one expedition signaled a new level of technical competence among a team that soon became known at the Proyecto Espeleológico Huautla, the Huautla Project.

"The Christmas caving season of 1974 was a very special one for AMCS activities in the Sierra de El Abra. An unprecedented stroke of luck befell us in the form of a road constructed from El Salvador on the Inter-American Highway directly across the range to Mina Otates on its eastern crest, a distance of about 18 kilometers. The placement of this road was auspicious indeed, since it led into one of the most desirable yet inaccessible regions of the jungle. Not only are numerous pits and sinkholes visible from the air, but the range is

also at its highest point, providing the potential for very deep caves." So wrote Mark Minton, a chemist at the University of Texas, in the spring of 1978. In the initial flurry of activity that followed the opening of the Otates road, Bill Russell discovered the Cueva de Diamante, named for the abundant quartz "diamonds" found in an arroyo leading into the entrance of the cave, which was at the bottom of a sinkhole 500 meters in diameter. Subsequent expeditions led by Minton and Tommy Shifflett succeeded in proving that Diamante was likely the most difficult vertical cave in all of Mexico, for it began as a body-tight fissure and continued relentlessly in that fashion to a depth of 621 meters, reached at the end of 1977. The last 500 meters of this remarkable cave were essentially straight down a vertical fissure that reached the base-level of the range, defined by the Río Tantoan [22]. Those who had persevered through the trials of Diamante, notably Minton, Shifflett, and Hal Lloyd, moved on to bigger game in Huautla.

In the meantime, Sprouse, Treacy, Dale Pate, and others had not been idle. By the fall of 1977, the Cueva del Brinco had reached a depth of 189 meters and a length of 5.2 kilometers, and they had entered Cueva de Infiernillo for a distance of 4.1 kilometers into the mountain. Based on a study of the computerized map of the region, the prospects for a connection appeared high, and so during the spring of 1978 Sprouse took the unprecedented step of organizing a three-month expedition to the Purificación area with the intention of realizing the connection. During the first month of the project, Sprouse and Treacy, joined by Gill Ediger, Sheila Balsdon, and Andy Grubbs, and later by Paul Fambro, David Honea, and others, pushed the World Beyond area in Brinco to a depth of approximately 450 meters, nearly 6 kilometers from the entrance. In late April, the team moved to Infiernillo for a week-long underground camp, situated a short distance inside the impres-

sive cliff-side entrance. In addition to Sprouse, Treacy, and Balsdon, the team included Charles Fromen and Mike Conolly. Some 4 kilometers from Camp I, the team explored on into new territory. Conolly and Fromen went ahead to scout the route. The others, who were bringing the survey in behind them, returned to camp in what proved to be a 14-hour trip. During this time they never saw the lead team.

Terri Treacy subsequently related one of the more magical moments in the exploration of Infiernillo. "Mike and Charles had not returned by the following morning. At 9 A.M. Peter and Sheila set out to find them. They reached the stream in two hours and were soon exploring passage where only Mike and Charles had been. . . . Peter and Sheila continued heading south trying to follow footprints. Further south in the large trunk, they climbed up a steep breakdown slope and passed through a crack along the right wall and emerged into a giant chamber; the left wall was 25 meters away. To the south all that could be seen was a huge 30- to 40-degree slope of breakdown and darkness heading upward. As they ascended the slope, they noticed the chamber dimensions were ever increasing, until, where the pile flattened out at the top, some 200 meters up, the walls were over 150 meters apart and the arched ceiling around 50 meters above the top of the breakdown. The floor again plummeted on the south side of the pile, to where the ceiling once again met the breakdown floor nearly 200 meters away, the end of the Netherhall." Despite this spectacular discovery, there was still no sign of Fromen or Conolly, who had apparently also come this way. After a ten-hour search, the two returned to camp, finding, to their relief, that the missing duo had returned only an hour earlier, having been lost for sixteen hours in a maze, appropriately named the Confusions Tubes, only 500 meters from camp. Sprouse and Balsdon had gone straight past them on the rescue attempt and independently rediscovered the Netherhall.

Despite three months of intense

mapping efforts, which increased the length of Brinco to 9.2 kilometers and Infiernillo to 6.6 kilometers, the connection remained elusive, although it was becoming obvious that they were very close indeed. In August 1978, Camp II was set in Infiernillo just before the Netherhall, 3 kilometers from the entrance. On the last day of this seven-day camp, Randy Rumor and Bob Anderson pressed onward for a phenomenal 1.5 kilometers beyond the previous limit of exploration. There they built a cairn in the middle of the tunnel and turned back. There was high anticipation that they had come very close to known passage in Brinco, but the campers were out of rations and were forced to retreat. When the team reached Camp I, they totaled the survey length. The degree of competition at this time with the Huautla group was evident in Treacy's log. "A totaling of the past three days of survey revealed that Infiernillo lacked only 13 meters to beat La Grieta as the third longest cave in Mexico. Peter Sprouse and Hal Lloyd grabbed some gear and trotted off to a nearby lead to make the historical Midnight Traverse survey, which netted 224 meters, bringing the total length of Infiernillo to 8993 meters." A much more substantial accomplishment awaited them in Cueva del Brinco, when, some four days later, Sprouse, Lloyd, and Peter Keys descended to the World Beyond. They soon came to an intersection with a north-south-trending passage that Sprouse had already been to. Treacy's log tells what happened then. "At this junction, Peter Sprouse spotted a piece of red flagging tied to a projection. He didn't recall anyone flagging in the area on the previous trip, so it seemed likely that it had been set by Bob and Randy coming in from Infiernillo. They had run right through Brinco and on into virgin passage," without ever realizing that they had already made the connection.

Several days later, Treacy joined the foursome, and they completed the survey of the missing link in the grand traverse. Lloyd and Keys then elected to descend towards

Infiernillo. In the course of this 28-hour odyssey, they established the world's deepest through-trip, the longest cave in Mexico, at 22.8 kilometers, and the deepest cave in Mexico, at 893 meters. Furthermore, they had done the entire descent using only two short ropes [23]. This accomplishment stunned the Mexican deep-caving community, and left those involved in the Huautla Project, in particular, reeling.

As one drives eastward from Mexico City and beyond the volcano of Malinche, the town of Zacapoaxtla is reached in a lush, rolling highland. A turn to the north takes one to the village of Jonotla. It is on the approach to this small town that one drives within a few hundred meters of the giant entrance to Sumidero de Jonotla. Reports by Nevin Davis in 1973 of this amazing karst feature, where one may travel up to 350 meters inside the entrance before needing a light, and of a sinking river named Sumidero de Atepolihuit found by Charles Plantz in 1974, led British caver Peter Lord, then living in Mexico City, to begin a more thorough investigation of the area. In December 1976, in the company of Peter Sprouse, Terri Treacy, David McKenzie, and others, Lord returned to the area to scout the karst near the village of Cuetzalan, some 5 kilometers to the east of Jonotla. During their first week, they located the entrances to Sumidero Chichicasapan, Atischalla Sur, Atischalla Norte, Cueva de Árbol de Resistol, and Sumidero de Cohuatichan, the primary entrances to what has subsequently become known as the Sistema Cuetzalan [24]. Steve Knutson, writing some years later, described the area that was to become Mexico's third major speleological project. "Cuetzalan is on a karst upland, which, in general, slopes to the east, where it merges with a plain of low elevation that continues to the Gulf of Mexico. The area is isolated from similar terrain to the north by the Río Zempoala (Tecuntepec) and to the south by the Río Apulco. The dip of the bedrock is somewhat var-

ied, but is generally to the north, and the caves trend in that direction. Pits are not common, and most entrances are of the sumidero type. Sistema Cuetzalan (and several closely related caves) lie beneath the town of Cuetzalan and vicinity. The highest entrance to this is at about 1300 meters, and the lowest point is the bottom of a separate cave, Atepolehuit (the local Nahuatl Indian name for Sumidero) at about 500 meters. This gives a depth potential for the system of about 800 meters." [25]

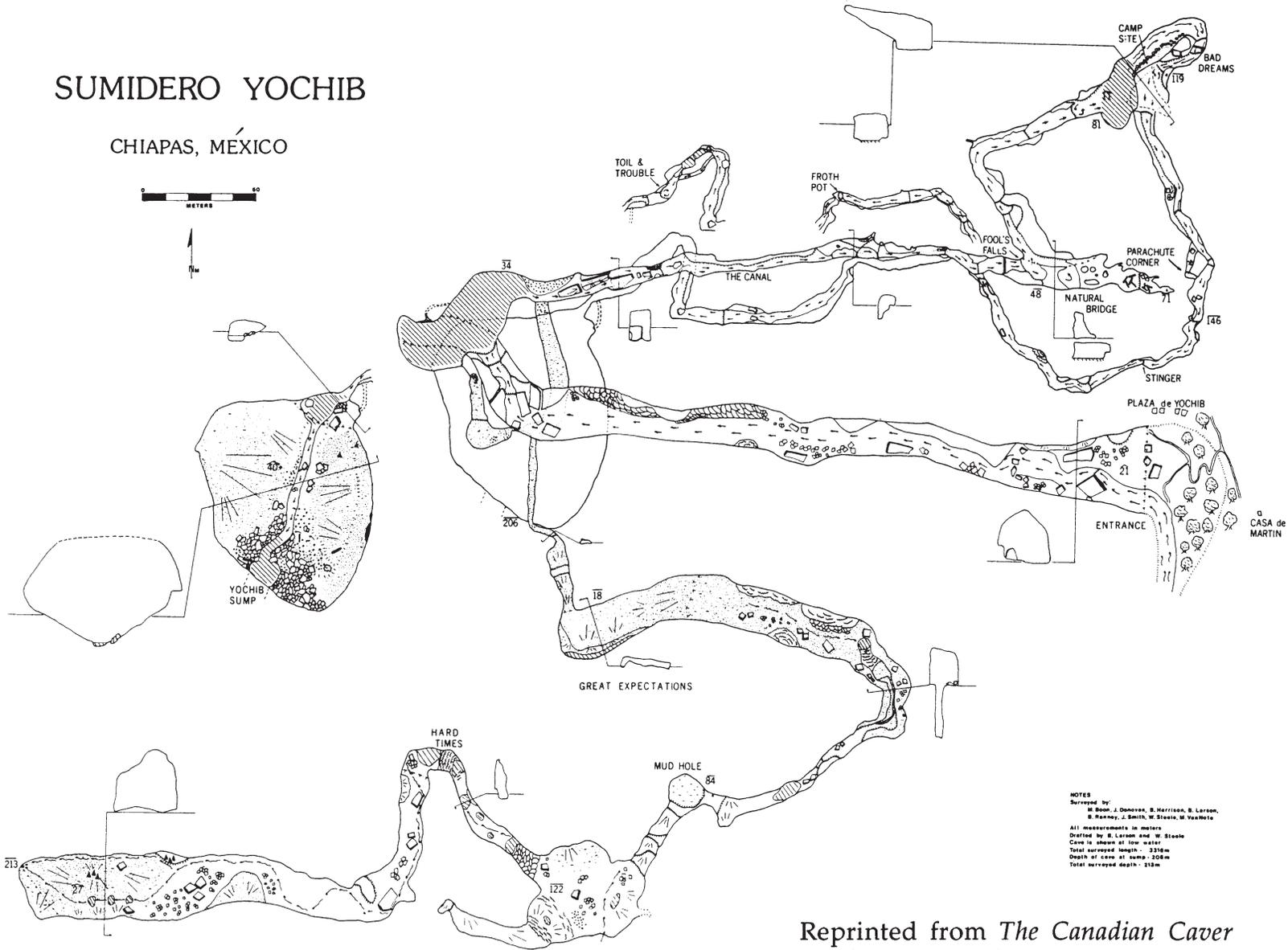
By December 1978, Sistema Cuetzalan had reached a length of 16 kilometers, largely through the efforts of Knutson, Bill Liebman, Joe Lieberz, Ernie Garza, and Chris Albers. At this time, the depth of the system was 528 meters. By the early 1980s, the length had grown to 22.4 kilometers and the depth to 587 meters, within 200 meters of Knutson's earlier prediction of the achievable vertical extent. Problems with survey data management led to the tackling of nearby unexplored caves instead of extended pushes in Cuetzalan. Cueva Tecolo was subsequently mapped, to 1.8 kilometers, and so was the 800-meter-long through trip in Sumidero Jonotla. In 1982, Knutson completed a 6.6-kilometer-long, 400-meter-deep through trip from Sumidero Santa Elena to the Río Zempoala. Two years later, the survey of Sumidero San Bernardo, near Xochitlán, was completed. That cave is 3.9 kilometers long and reaches a depth of 215 meters [26].

By December 1984, the list of easily accessible, going leads had dwindled, and interest in the Cuetzalan area waned, despite the fact that several major connections remained unachieved in what was then Mexico's second-longest system. Knutson, the chief architect and cartographer for the project, began a series of expeditions to Guatemala to search for deeper caves. Except for occasional recreational visits, the area has not been worked since (as of 1992).

Exploration in Huautla in 1980 began with the accident and rescue of Polish caver Josef Cuber at the -620-meter level in Sótano de San

SUMIDERO YOCHIB

CHIAPAS, MÉXICO



NOTES
 Surveyed by:
 W. Steel, J. Downer, B. Harrison, B. Larson,
 B. Heaney, J. Smith, W. Steele, M. Vashita
 All measurements in meters
 Drafted by B. Larson and W. Steele
 Cave is shown at low water
 Total surveyed length - 3316m
 Depth of cave at some - 208m
 Total surveyed depth - 113m

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Agustín. Later in that spring, Li Nita was pushed to -1030 meters, becoming the first cave in Mexico to break the thousand-meter barrier, and then connected by a short scuba dive to San Agustín, making Sistema Huautla 1222 meters deep. In 1981, the sump at the bottom of San Agustín was dived, adding 26 meters to the depth of the system.

To the north of the Huautla massif lies the striking Cerro Zizintepetl. Rising abruptly from the canyon of the Río Petlapa to an elevation of more than three thousand meters, it is visible from as far as one hundred kilometers to the north and south along the range. In December of 1976, an AMCS team led by Peter Strickland and Preston Forsythe was able to reach the town of Zoquitlán on the north side of the Zizintepetl. Within a day's hike east of Zoquitlán they found several large closed valleys leading to the entrances of Sótano de Coyomeapan and Cueva de Xocotlat. A year later the team returned, joined by Mike Boon and Jerry Atkinson. The entrance to Sótano del Río Coyomeapan consists of a spectacular 82-meter shaft with a large waterfall. The promise of a very deep system was dashed, however, when the team encountered a sump at a depth of 166 meters. They then turned their attention to Cueva de Xocotlat, where they reached a depth of 289 meters, with the cave still going in very wet conditions [27].

During the Christmas season of 1978, a strong team, now including Steve Zeman, Dino Lowrey, Tommy Shifflett, and Mark Minton, returned to Xocotlat. With water levels lower than the previous year, Shifflett and Minton reached a sump at a depth of 339 meters. Meanwhile, on the surface, a political delegation from Zoquitlán had arrived in basecamp during the afternoon of the push. The local inhabitants, the *presidente* explained with some embarrassment, believed the cavers to be stealing gold and silver from the caves. The problem, he went on, was that if he permitted the expedition to continue, it would appear that he and his

political party were receiving kickbacks from the "mining operation." The expedition was asked to leave immediately, and it was only through difficult negotiation that Atkinson and Zeman were able to convince the authorities to allow a two-day grace period to derig the caves. There were more than seven hundred meters of line in Xocotlat alone, and Minton and crew were, at that very moment, rigging downward to the sump. When they reached their vehicles in Zoquitlán, following what must be considered a substantial feat of derigging three deep caves and packing basecamp within forty-eight hours, further insult awaited. They were met by the town officials and police, who demanded that each duffel bag be emptied into the town square for inspection. At Atkinson later wrote, "it was like a border crossing, only with much more dire consequences if we did not pass. We did." Unfortunately, the incident brought an immediate end to work in what clearly was a promising new area [28].

In the spring of 1982, a group of Belgian cavers from Groupe Spéléo Alpin Belge led by Georges Feller, Guy Meauxsoone, and Patrick Bestgen returned to Zoquitlán, in much improved political conditions. With the blessing and assistance of the Texans, they continued the exploration of Sótano del Río Coyomeapan, where, in much drier conditions than 1978, they were able to continue down seven additional drops to a series of large rooms and fossil passages. The cave reached a depth of 316 meters and a length of 3 kilometers. Exploration was also continued in the Sumidero del Río Xocotlat, near Cueva de Xocotlat, which had been discovered in 1978 by Jocie Hooper and Peter Strickland. There the Belgians reached a terminal breakdown at a depth of 323 meters [29].

A follow-up reconnaissance expedition in 1983 by Meauxsoone and Bestgen was fielded to a mountain range northwest of Zoquitlán that reaches an elevation of 2500 meters near the village of Alcomunga. There, several large closed valleys end in sumideros. That

these river sinks took substantial drainage was shown by the presence of massive log jams, which generally prevented further exploration. Many very deep pits were reported by the local inhabitants. The probable resurgences from the Alcomunga highland lie some 15 kilometers to the southeast at 350-meter elevation near the jungle-covered coastal plain. The resurgence at Coyolapa, near Tlacotepec de Díaz, flows from a large cave known locally as Coyolatl. Feller and others were shown several sótanos in the area, as well as a large, dry fossil resurgence called Oztopolco. Above this, at an elevation of 500 meters, is a large cave called Xantilco, with an entrance 80 meters in diameter. Daylight may be seen as far as 400 meters into the large, descending passage. At the end of this most promising reconnaissance expedition [30], it was clear that the Belgians had done their homework, and that the stage had been set for something momentous to happen. It would not be long in coming.

It must be appreciated that what the Texan explorers had come to view as their familiar back yard during the previous 25 years (many of them speaking fluent Spanish, having a deep appreciation for local customs, and having come to know the inhabitants of the major caving regions as personal friends) was all new, the entire country, to the Europeans. That novelty and the ease with which substantial discoveries could be made is evident in a summary introduction to the 1985 Belgian return expedition, by Georges Feller. "Without a doubt, Mexican karst has proven that the El Dorado of speleology is truly found in the land of sombreros and tequila. That alone was good enough reason to organize a remote expedition. It's not that our ten years of excursions into Austria were boring. . . . We spent a fascinating two months on the [Alcomunga] plateau between the desert and the jungle. The difficulties we encountered represent little compared to the discoveries made. One can judge for oneself: three archaeological sites, 35

kilometers of passage surveyed, including two rooms that count among the largest in the world." Their team of sixteen explorers split into two groups, with Feller leading the resurgence team to Coyolatl and Patrick Bestgen leading the team to the top of the plateau. The resurgence team set camp inside Coyolatl, which had a substantial flow of 10 cubic meters per second, and soon had mapped a phenomenal 19 kilometers of galleries. The cave still continues [31].

Meanwhile, on the high plateau, Bestgen and crew began a systematic exploration of a number of deep pits around the village of Ocotempa, to the east of Alcomunga. Ultimately, they came to a deep pit initially labeled OC3, which soon acquired a more exotic name, Pozo Verde. After several failed attempts, the bottom of the shaft was reached at a depth reported by the Belgians to be 380 meters [32]. French speleological historian Paul Courbon, then completing work on his 1986 *Atlas des grandes cavités mondiales*, proceeded to list Pozo Verde as the deepest shaft in the New World, the French having also decided to downgrade El Sótano del Barro to 364 meters, despite the Texan wire measurement.

The Pozo Verde was not the only significant find made in the Ocotempa area in 1985. Serge Delaby and François Guinand were shown a cave at 1400 meters elevation about two hour's walk from Ocotempa. Beyond a 115-meter entrance shaft and a half-dozen pits in the 20- to 30-meter range, they squeezed through a breakdown choke to find themselves standing in an enormous hall, which ultimately proved to measure 350 meters long by 100 to 150 wide. They retreated to inform the team of this new find, Sótano de Aztotempa. Certainly not lacking in grandeur, the main route out of the large room was found to be a 140-meter shaft, which ultimately was followed by Feller, Delaby, and Richard Grebeude down an additional 150 meters of shafts to a sump at -700 meters. The promise of the Alcomunga plateau was beginning to be realized.

Twenty kilometers northeast of Alcomunga and about 40 kilometers south of the major city of Cordoba, Puebla, lies the Sierra Zongolica, averaging about 1500 meters high. The area is characterized by high annual rainfall and numerous river sinks, the most spectacular of which is El Popoca, 10 kilometers northeast of the town of Zongolica, near the small village of San Sebastián. This area was first visited in 1977 by Claude Chabert and others of the Spéléo Club de Paris [33]. Their initial discovery was Atlalaxia de Atikpak. Atlalaxia is the name that Nahuatl Indians of the sierra give the large sinkholes that engulf entire rivers, generally in line with the fractures that affect the mountains of the Zongolica karst. Two hours by foot west of Zongolica, the sink of the Altotonga river represents the largest known karst feature in the region. There the Atlalaxia de Atikpak swallows the river at the end of Palulca Canyon. The entrance is 25 meters wide and 15 meters high, and the cave continues with similar dimensions to a sump at a depth of 320 meters. This point was reached in May 1981 by Philippe Ackermann and Genevieve Rouillon of the Fédération Française de Spéléologie, who, some two months earlier, had begun what would prove to be a phenomenal twelve-month expedition to the Sierra Zongolica.

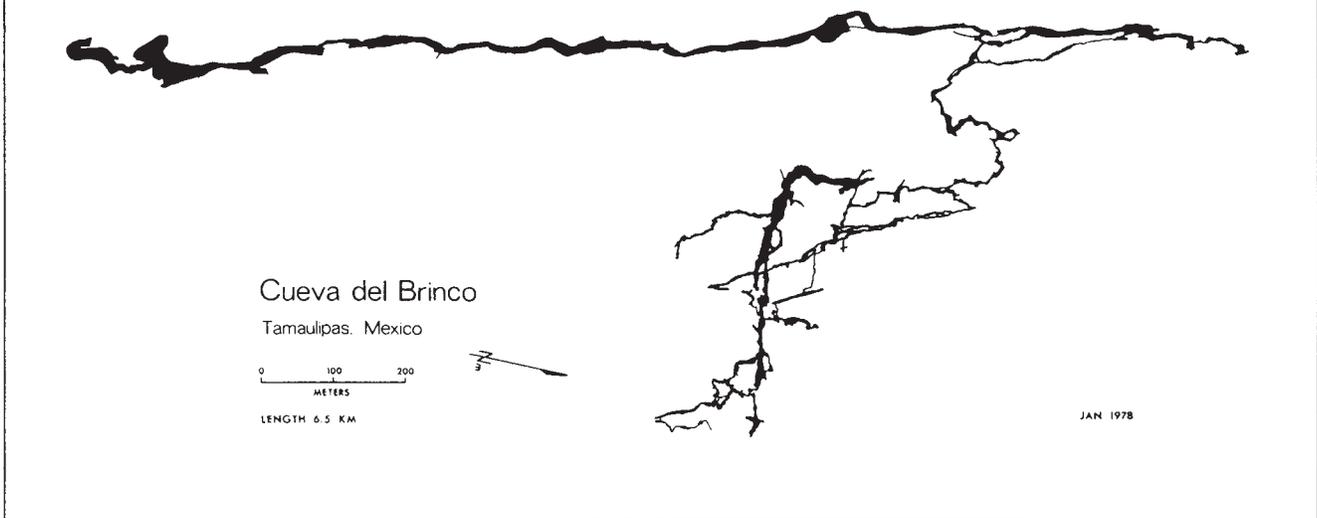
In July 1980, Ackermann and Rouillon traveled north to San Sebastián, where they were subsequently shown the Sumidero de El Popoca. Ackermann's narrative captures the spirit of that moment: "A wall of mist rises to more than 25 meters above the jungle. A 15-meter-wide river, full of mud and silt, cascades into one of the most formidable caves we were to come across. The vertical entrance is more than 45 meters in diameter and swallows the entire river in a falls of 60 meters. The roaring can be heard more than a half-hour's walk away." Since this was the heart of the rainy season, they chose to postpone exploration until March of the following year. In September, however, they related their new discovery to Carlos Lazcano and

his companions from the Sociedad Mexicana de Exploraciones Subterráneas. Ackermann continues, "Seeing their interest and mistakenly thinking that scooping was still not institutionalized here, we told them exactly where the cave was. It was therefore surprising that in December we found out that Mexican cavers had scooped us and gone to El Popoca in October. They went down the entrance pit, but had not penetrated any further, due to high water levels." Ackermann and Rouillon returned in January 1981 to make a rather disappointing discovery. After such a spectacular beginning, El Popoca ended in a sump just 200 meters further on, at a depth of 76 meters. They had, in the parlance of international deep-cave exploration, been Ghar Paraued.

As they left Popoca, Ackermann was greeted by a group of locals. The eldest, named Luis, suggested that they visit a deep sótano at the top of the mountain. Ackermann later related a rather unusual twist to a situation confronted by many explorers in Mexico. "Since there are so many sótanos around, I didn't pay him too much attention, but he insisted. 'It is very deep. A woman from my village fell into it long ago.'" Luis asked us to search for her remains. As far as the depth of this sótano, I tried not to get my hopes up, because according to the Nahuatl Indians, all pits are bottomless. Experience had taught us that a bottomless pit was rarely deeper than 50 meters. Seeing my hesitation, Luis insisted, "Señor, if one drops a stone, it takes thirteen seconds to hit." He then showed me a fancy stopwatch that he had under the folds of his serape. Suddenly my curiosity was sparked." The new pit, known as Sótano de Tomasa Kiahua, was some 20 meters in diameter and indeed proved to be eleven to thirteen seconds deep. It was subsequently measured, during the course of several attempts by Ackermann and Rouillon, at 330 meters sheer [34].

In the spring of 1983, Ackermann and others returned to make a documentary film of the area for French television. While in the

Reprinted from *AMCS Activities Newsletter* number 8 page 57, 1978.
(Compare, for instance, number 18 following page 100, 1991.)



San Sebastian area, they decided to film Sótano de Apopoliucan, which, along with nearby Sótano de Ahuihuizcapa, had been recently explored by a Mexican team under Lazcano's direction and was known to continue. Steve Robertson, an American observer on the filming project, later wrote: "A persistent drizzle kept us from filming in the Apopoliucan, so we decided to go have a look at the entrance to Ahuihuizcapa. The entrance was even more beautiful than the Apopoliucan, with rocks hitting after seven seconds or so. It was so impressive that Ackermann and the others decided to scoop the Mexicans here." Ultimately, they bottomed the cave at a sump at -445 meters, nearly doubling the known extent of the cave [35]. The response from Lazcano in the *AMCS Activities Newsletter* was not unexpected: "In late February 1983, a group of French cavers exploring in the Zongolica area of Veracruz committed one of the lowest acts of piracy that has occurred in Mexico. The French, knowing that Mexican cavers had explored down 200 meters in Ahuihuizcapa and that it continued, decided to explore it themselves, with no consideration for the Mexican team. . . . Person-

ally, I have come to develop a great admiration for French speleology. The writings of legendary figures such as Casteret, de Joly, and others have inspired in me fascination and love for caves. It is sad that along with the great speleologists, there is also trash." These incidents of inter-team rivalry served to rekindle concerns, originally voiced after the Polish expedition to San Agustín, that a breakdown of the unspoken explorers' code of honor was imminent. Fortunately, in the intervening years peer pressure seems to have brought an end to piracy in Mexico, and gentlemen's ethics have reigned, to the benefit of the many groups working in close geographic proximity of one another.

In 1984, an expedition assembled by Bill Stone pushed Cueva de Peña Colorada, a cave in the canyon near the Huautla resurgence. This major diving project surveyed 9 kilometers in the cave, 2.16 of which is underwater. Exploration ended at deep Sump VII. And continued exploration in the caves on the Huautla Plateau in the middle 1980s culminated in the connection of Nita Nanta into the system, resulting in a depth of 1353 meters and a length of 52.7 kilometers.

From the time of Bonet in the 1950s, there were always occasional groups from the Mexico City area, mostly associated with the Universidad Nacional Autónoma de México, who undertook weekend outings to some of the more well known caves, including the Dos Bocas system in Guerrero and the deep pits in Querétaro and San Luis Potosí. As a rule, however, there was very little base from which to form a more advanced team that could conduct original exploration. All that changed in 1975, when Sergio Zambrano took an interest in deep caving. Zambrano was no college-age student, but rather a successful international businessman in his mid-thirties. In addition to being president of the Asociación Alpina de México and having led several expeditions to the Himalayas, he also held the Mexican high-altitude parachuting record. In the spring of 1975, Zambrano became aware of the AMCS and developed a regular correspondence with Peter Sprouse, who advised him of locations where original reconnaissance might be productive. Zambrano subsequently discovered the Sótano de Tilaco, located 20 kilometers west of the town of Jalpan, Querétaro.

With fellow AAM members Hugo Montejo and Raúl Pérez Martínez, he reached a depth of 150 meters before running out of tackle. Eight months later, they returned and reached -250 meters, and in the spring of 1976 they reached -350 meters. Four years later, a joint expedition between the AAM and the newly formed Sociedad Mexicana de Exploraciones Subterráneas returned and pushed Tilaco to its end at -649 meters [36]. On the bottoming crew were Carlos Lazcano and Hector Guzman, both students at UNAM. Lazcano, the founder of the SMES, was soon to become the driving force behind the Mexico City-based exploration team.

In May 1982, Lazcano, joined by Victor Granados and Eusebio Hernandez, bottomed the Resumidero del Pozo Blanco, a 233-meter shaft on Cerro Grande, Jalisco. Later that same year, the nearby Sótano de la Virgen was explored to -352 meters. In 1984, Lazcano was contacted by Ramón Espinasa to assist with the exploration of a deep system he had discovered near the Ejido San Miguel in Guerrero. These two subsequently became fast allies and explored the Hoyo de San Miguel to a depth of 455 meters, still the deepest cave in Guerrero [37]. During 1983, Lazcano had traveled to Florida, where he received training in cave diving along with the Peña Colorada team, which also included Sergio Zambrano and Angel Soto, the latter of whom was to found the Asociación Mexicana de Buceos en Cuevas. With these new skills, Lazcano dived the Nacimiento del Río Toxin, near Cerro Grande, for more than 100 meters to his safe air limits. Above this resurgence lies the Resumidero de Toxin. This river system was mapped by Lazcano and Espinasa to 3 kilometers long and 95 meters deep [38]. By 1987, Lazcano had completed his degree in hydrogeology at UNAM and accepted a job in Merida, Yucatán. From this location he did much original surface reconnaissance of the deep cenotes in the area, but the distance to the deep caving areas was to place a severe im-

pediment on Lazcano's ability to extend his notable list of accomplishments.

In April 1987, another UNAM group, known as Draco, began explorations in the Arroyo Grande highlands of Oaxaca. The most notable discovery made by members of this group, including Javier Garcia, José Montiel, and Gloria Camacho de Montiel, was the Sótano del Arroyo Grande, a 283-meter sheer pit that currently (1996) stands as the eighth-deepest known shaft in Mexico.

In April 1985, an Australian team headed by Alan Warild, having spent an unproductive four weeks on the top of Cerro Zizintepetl, moved on to a new area near the town of Santa Maria Chilchotla, just 5 kilometers north of Nita Nanta in the Sistema Huautla. Near the small village of Zongolica, the team made a major discovery at Nita Xonga, but ran short on time. A two-month return trip was fielded in November, during which a phenomenal number of deep caves were explored and surveyed.

Warild's secret weapon was the introduction of the rebelay rigging technique that had come into wide use in Europe in the early 1980s. The approach, simply, involves the use of intermediate anchors (rebelay) on long shafts to allow several members of a team to ascend simultaneously, and the use of climbing aids to pull the line away from sharp edges (redirections). This allows the use of smaller-diameter 9-millimeter rope, a significant logistical advantage over the American standard 11-millimeter line. A small day pack, for example, can carry 200 meters of 9-millimeter line, while the same pack can only carry, at best, around 120 meters of 11-millimeter line. These techniques do, however, often result in ropework maneuvers that are little short of acrobatic, a serious issue when transporting the bulkier equipment needed for prolonged stays at depth. However, unlike the Americans, Warild's team had never enjoyed long underground camps, preferring instead a blitz

philosophy of marathon light-weight forays based from the surface. At Chilchotla, they refined this technique to new levels. By the time the expedition was over, Nita Xonga had been explored to a depth of 740 meters. But that was merely the beginning. Nita Chaki reached 493 meters, Nca Nita, 240, Chatsi Guinjao, 220, Guixani Ndia Guinjao, 940, Sonyance, 745, and Sondanga, 213. In all, 4.3 kilometers of vertical virgin cave had been explored and mapped, bringing the total length of the known caves in the Chilchotla region to 8.4 kilometers. None, however, had been connected, despite a cave density approaching that of Sistema Huautla [39].

During a return expedition in December 1987, three new deep caves were discovered in the same area, Yua Nita, 704 meters deep, Nita Cho, 894 meters, and Sonconga, 943 meters, with all again being explored from the surface on day trips. Maddeningly, for Warild, they were never able to connect any of these very deep, nearly vertical routes, nor to crack the magic one-thousand-meter mark [40]. With viable leads dwindling, Warild expanded the operation westward to the highland area near the town of San Jeronimo that had been briefly visited by Texas explorers in 1970. In the spring of 1990 [41], while returning to the surface following a push on a promising new find in this area, Warild was nearly killed when a rebelay, which had been set on a boulder that projected from the wall of the entrance shaft, pulled out, bringing with it a fifty-kilogram chunk of the boulder. The rockfall fortunately did not cut the rope. Warild dropped several meters and might have ridden it out had he not been hit by the debris. The impact broke his collarbone and right arm and induced a severe concussion. Anne Grey, the team's physician, managed to stabilize Warild's condition until he could be transported to the nearest hospital, at Tehuacan, some 180 kilometers away. The injuries were severe enough that he was unable to fly home to Australia for nearly two months. No further work in

the Chilchotla area has been undertaken since (as of 1992).

Although not a major system, of particular note during this time period was the discovery, near the town of Cintalapa in Chiapas, of Sótano de la Lucha by an expedition led by Italian Tullio Bernabei and Mexican Carlos Lazcano. This pit was originally located by an inspection of aerial photos in 1973 and was well known to pilots flying between Oaxaca City and San Cristóbal de las Casas. But it took until 1981 to arrange the logistics of actually reaching the pit on foot and until 1986 for the pit to be descended. The entrance shaft is nearly 200 meters in diameter and sports a 240-meter free drop into a jungle-floored fantasy world. Further adding to the allure of this cave is the presence of a 20-meter-wide arroyo that runs across the floor of the pit and leads both upstream and downstream. The upstream branch leads more than a kilometer before opening into a spectacular 30-meter-wide arroyo that courses through a canopy of extremely dense rain forest. La Lucha, with its pristine white-banded limestone, is considered one of the most beautiful pits in all of Mexico [42].

The announcement to the world in Courbon's *Atlas* that Pozo Verde in Sótano de Ocotempa was the deepest in Mexico naturally caught the attention of many in the AMCS, not least Terry Raines, one of the original explorers of El Sótano del Barro. In January 1987, Raines, together with Marion Smith and others, came equipped with electronic distance-measuring equipment, which Raines had recently begun using to precisely measure the deep pits of Mexico. Raines later wrote, "We were looking forward to the 380-meter rappel. I guessed that the depth would be within 20 meters either way of the 380-meter figure when measured exactly with our electronic distance-meter, but what a surprise we were in for. We rigged from the natural bridge as shown on the [Belgians'] map and found two drops where they had found one! At first I wondered if we were in the same cave. Explora-

tion and comparison with their map showed that we were indeed in the same cave. But our survey showed the entrance to be two separate drops of 221.3 and 82.4 meters, a total of 303.7 meters."

The resurvey of the entrance drop had scarcely been completed when word came from a team that had gone to the Belgians' end of exploration at -400 meters that Alan Cressler had discovered a continuation through a narrow crawlway. Raines joined them and continued on to a narrow fissure. "Immediately I found myself approaching a window on hands and knees, trying to keep my light from being blown out. I was at the edge of a great pit with air rushing down into it. A rock bounced for five to six seconds." A month later, Raines and Smith returned, ultimately reaching a depth of 647 meters. Three months later, in May 1987, they returned again, this time with a ten-person team that included Mexican caver Mauricio Tapie and Canadian Marc Tremblay. As on the previous push, they were soon out of rope, this time at a depth of 873 meters [43]. In December 1987, a massive expedition met at Ocotempa, planning to set an underground camp at the base of the second shaft, at the -300-meter level. In addition to those present for the May push, the team was joined by Jim Smith, Ed Holladay, Mark Minton, and eight others from the United States, plus Serge Delaby, Michel Dupris, and François Saussus from the Belgian team that had originally found Ocotempa. Less than three days after they arrived, the cave was bottomed by Smith, Smith, and Holladay at a sump at a depth of 1017 meters, a few hundred meters beyond the point reached by the May expedition. Even though they had been Ghar Paraued, Ocotempa became the third thousand-meter-deep cave in Mexico [44].

After the Americans had packed up camp, Delaby and the other Belgians stayed on, working in the high karst south of Ocotempa. In the course of this work a new entrance to Ocotempa, independent of Pozo Verde, was discovered. This

route, which connected to an upstream canyon at the -850-meter level that had been found by Marion Smith and Greg McNamara in May 1987, added 46 meters, boosting the depth of the system to 1063 meters. Information concerning this find and the rest of their expedition is scarce, but rumors in May 1991 indicated that the Belgians had made a major discovery in this area, perhaps a substantial extension to Akemati [45].

The Sierra Negra is the name of a mountainous plateau at an elevation of 1500 meters on the eastern slopes of Cerro Zizintepetl. It is bounded on the north by the Río Coyolapa and on the south by the Río Petlapa, and it is approximately 60 kilometers south of Córdoba, Puebla. Access is by mule train south from the town of Tlacotepec de Díaz or east from Santa María Chilchotla, north of Huautla. Following his work with the American team at Ocotempa, French-Canadian Marc Tremblay began researching areas for a possible major project for the Société Québécoise de Spéléologie, and in the spring of 1988 he fielded a large team, mostly from Quebec, but including several other Canadians and Americans, to the Sierra Negra. Access to this area proved more difficult than expected. First the team attempted to enter via Chilchotla, but found no transportation that would cross the Río Petlapa. They then attempted the northern route, only to be met with political roadblocks at Tlacotepec de Díaz, in the heart of Nahuatl country. Ultimately, permission at the state level was obtained in Puebla, and the expedition was able to reach its intended basecamp in the Nahuatl village of La Cumbre, three weeks later than intended. The wait, in Tremblay's words, was worth it. He wrote, "The first day we arrived at La Cumbre, locals pointed out caves to us at all four points of the compass. And big ones! On our way to the first entrance, we had no doubt of the formidable potential hidden in the bowels of the Sierra Negra. One of the caves we found that day deserves the name 'monster.'

Cuetzalan Area

Puebla, México

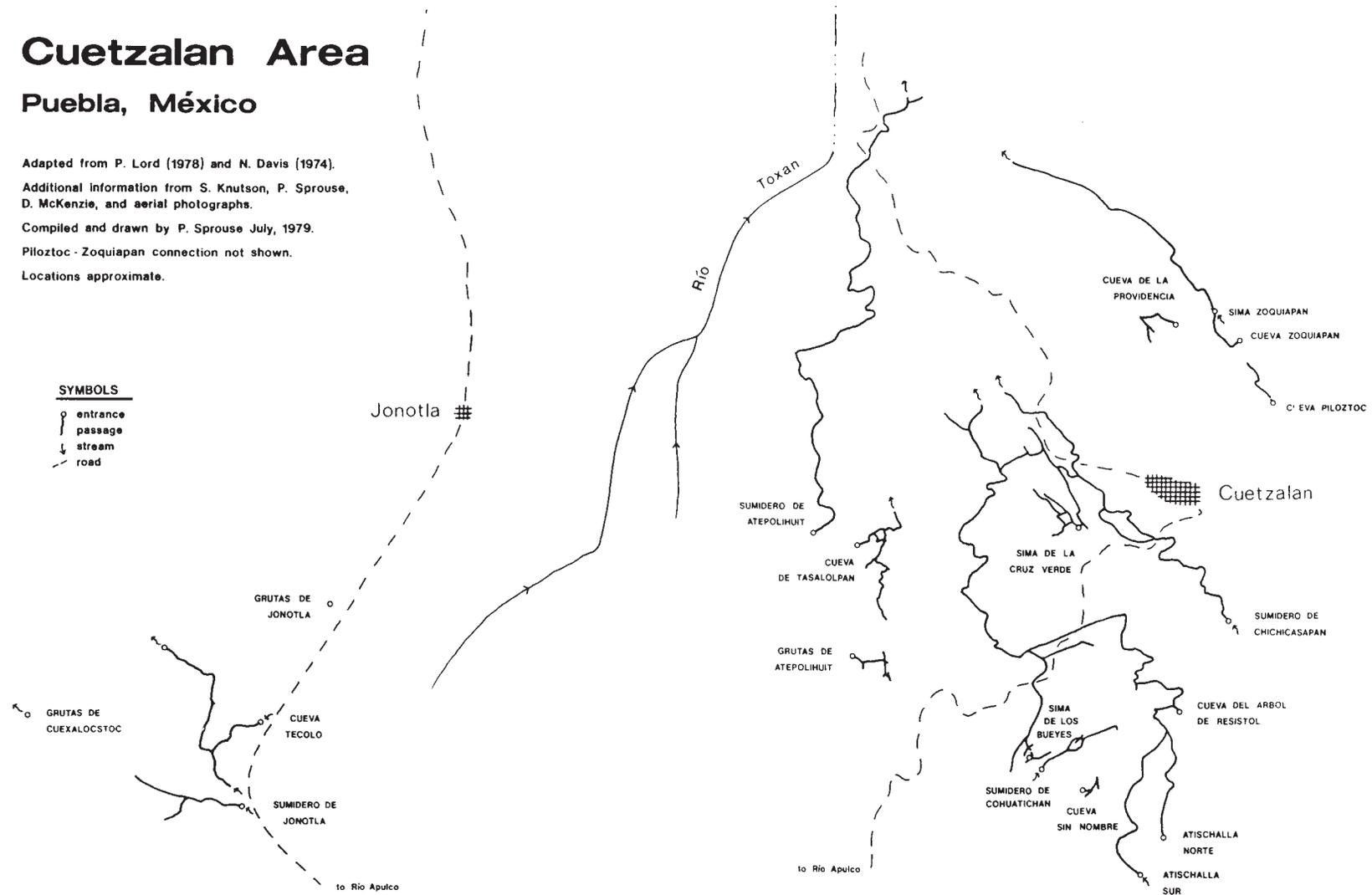
Adapted from P. Lord (1978) and N. Davis (1974).

Additional information from S. Knutson, P. Sprouse, D. McKenzie, and aerial photographs.

Compiled and drawn by P. Sprouse July, 1979.

Piloztoc - Zoquiapan connection not shown.

Locations approximate.



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 (Compare map in "Mexico News" in this issue.)

Sótano de los Planos, as we named it later, was known to the local population, but apparently not considered important . . . or were they hiding their real feelings?"

First to view the entrance to Sótano de los Planos were Jane Mulkewich, Terry Raines, Louise Hose, and Marc Tremblay. Tremblay soon had a line rigged and descended the massive moss-covered funnel leading into what proved to be a 220-meter entrance drop. This was followed, in what surely must have been a vertical caver's dream come true, by a 122-meter shaft and then a 105-meter shaft. This was sufficient cause for a camp to be set at the bottom of the second pit, at a depth of 449 meters, where daylight could still be seen. Unfortunately, the cave soon ended at a sump at -694 meters. Interestingly, however, a major upstream gallery was encountered at the -557-meter level that presumably still continues above the aven where exploration was halted.

Further to the southwest of La Cumbre, a line of promising dolines was discovered by Steve Worthington, Claude Godcharles, and Michel Labrie. One of these finds came to be known as Sótano de Alhuastle. The second pit in Alhuastle, explored by Worthington, Jean-Pierre Boivin, and Natalie Chapedelaine, proved to be an astounding 329-meter sheer drop. Despite this auspicious beginning, the cave sumped at 410 meters and had relatively little horizontal development. This area is sure to see further work, for the limestone extends from springs at approximately 350 meters to the top of nearby Cerro Zizintepetl, at 3250 meters [46].

Considering the long history of Mexican speleology, the exploration of underwater caves in Mexico was slow in coming and generally had its roots in sump dives targeted to extend the depth of already deep caves beyond so-called terminal sumps or to look at the resurgences of deep caves for possible alternative entry points. In the spring of 1976, Mike Boon dove the Cruz Pilal resurgence of Yochib to a depth of 30 meters, but had to

retreat when freeflow failures occurred in both of his regulators. One of the first dives at the bottom of a deep cave was undertaken by Stone at the Hoya de las Guaguas, south of Golondrinas, in September 1978. A small canyon leads off the bottom of the 220-meter-diameter second chamber to a sump at -464 meters. Stone dived the small sump at the bottom to a depth of 14 meters before the passage became too restricted; the original hope had been to extend the depth of Guaguas to over 500 meters by means of the dive. Later on this same trip, Stone and Texan diver Rick Blevins made a 55-meter-deep exploration dive in the major river resurgence at the Nacimiento del Río Sabinas, at the base of the Sierra de Guatemala 20 kilometers northwest of Mante [47].

The Río Sabinas dive immediately caught the attention of Sheck Exley, who subsequently organized a major return expedition in the spring of 1979, the team of which might be read as a Who's Who of the Florida deep cave-diving community. Laden with more than ninety scuba tanks, their first target was the Río Sabinas. A series of dives there culminated with Dale Sweet, Steve Forman, and Ken Fulghum reaching a depth of 95 meters at a distance of 175 meters from the entrance, where the cave narrows and begins to steepen its descent. The team then moved on to the Nacimiento Mante, approximately 10 kilometers west of the town of Mante. There Exley and Paul DeLoach reached a depth of 101 meters before air limits forced a return. This particular shaft continued straight down as a fissure averaging 20 meters long by 3 meters wide. Many additional deep springs were explored during the expedition; most notable was a 379-meter horizontal penetration, at an average depth of 28 meters, at the Nacimiento Choy on the east side of the Sierra de El Abra. Several airbells were noted and explored, and the tunnel continues west toward the known valley systems of Sótano de Soyate, Sótano del Arroyo, and the other long, horizontal caverns of the Los Sabinos, San Luis Potosí, area [48].

In 1981, Exley explored Cueva de Nonec, near the Yucatan resort town of Akumal, giving indications of the likelihood of very long underwater caves in this area. Three years later, the 1984 Peña Colorada expedition spent two weeks in this area, armed with the full complement of hardware used in Huautla. Several amazing penetrations of more than 500 meters were made in underwater caverns off the lagoon at Xel-Há—amazing because these long pushes were done with single Y-valve tanks, the average depth being only 8 meters. A large number of sites were visited during this reconnaissance, including a cenote known as Car Wash in which, below an algae-filled layer at the halocline, a dramatic, formation-filled tunnel takes off.

In 1985, Carlos Lazcano reported plumbing cenotes in the Valladolid, Yucatán, area. The deepest of these, the Cenote Xkolac in the Municipio de Tunkas, has a water depth of at least 125 meters [49]. By this time John Zumrick, one of the members of the Peña Colorada team, had made several returns to the Yucatan, where he met and trained two divers, Jim Coke and Mike Madden, who ran the scuba shop at Akumal, in cave diving. Coke subsequently discovered the Cenote Naharón, which, by the summer of 1987, had reached a surveyed length of 1.79 kilometers and a maximum depth of 20 meters. By 1990, Naharón had been connected to the nearby Maya Blue Cenote to create a system more than 4.5 kilometers long. Meanwhile, another spectacular formation-filled underwater cavern, the Nahoch Nah Chich, located on a plantation some 30 kilometers west of Akumal, reached a length of 10 kilometers, making it the second longest known underwater cavern in the world. The Akumal area in particular and the east coast of Quintana Roo in general have become a second home for many front-line Florida cave divers looking for easy booty. It is the opinion of many that the world's longest underwater cavern will soon be discovered beneath this area [50].

Exley's work at the Nacimiento

Mante resumed in 1987, and it is clear from the forward to one of his articles from this era that he knew exactly where he stood and the dangers that confronted him. "I paused at the lip of what could be the world's deepest pit. Aiming the beam of my lamp downward, I saw the slender white thread of my rope plummeting past jagged gray walls before disappearing in the darkness. I dropped a small rock down the pit, and it disappeared without a sound. Geologic evidence suggested that it could be more than 600 meters deep. . . . Golondrinas was less than 30 kilometers south, in the same mountain range. I felt a surge of adrenaline as I leaned out farther and began my descent without being attached to the rope. . . . After all, the rope was only 1.6 millimeters in diameter! . . . The pit at Mante is completely filled with water." In March of 1987, using a trimix breathing gas of helium, nitrogen, and oxygen, Exley reached a depth of 183 meters in the Mante [51]. Then, just two months later, he returned to reach a depth of 201 meters, tying Jochen Hasenmayer's record-deep dive in the Fountain de Vaucluse in France. In June 1988, with the help of support divers Mary Ellen Eckhoff, who did a dive to 122 meters herself, Sergio Zambrano, and Angel Soto, Exley reached a depth of 243 meters in the Mante, and it still continued straight down [52]. It was beginning to look like his earlier prediction regarding depth potential might be realized. In June 1989, Exley returned once again, this time extending the line to a depth of 266 meters, where equipment malfunction forced him to abort the mission. On his way up, he did more than thirteen hours of decompression in fifty-two stops [53].

It has been said that it is still anyone's guess where, ultimately, the world's deepest cave will reside. The pursuit of the unpredictable is part of the attraction of this endeavor we call cave exploration. Never was surprise greater than in December 1987, when it was learned that a 700-meter-deep cave had been discovered in the Sierra

Juárez, only 20 kilometers south of Sistema Huautla. The entrance to this new cave, named Cueva Cheve by its discoverers Bill Farr and Carol Vesely, was set in a tropical pine forest at an elevation of 2700 meters, more than 900 meters higher than the mean elevation of the Huautla Plateau. Hidden by an intervening ridge just south of the Santo Domingo Canyon, the vast difference in elevation had never been realized by those working in Huautla for nearly twenty-five years. Those familiar with the geology of the region immediately recognized the possibility that Cueva Cheve was the counterpart of the Huautla System, draining north towards the Santo Domingo rather than south, and with much greater depth potential. With this background, it was not surprising that many of the deep-cave explorers in the United States volunteered for the return expedition being planned for March 1988.

Like that of many large cave systems, the entrance to Cueva Cheve is located in a depression. But this particular depression is visible on a 1:125,000 topographic map. Drainage valleys, founded on metamorphic rock, radiate as far as 5 kilometers from the entrance. These valleys meet at a small circular, grassy depression known as Llano Cheve, and it is there that one gets the message that something vast, hydrologically speaking, is afoot. Stretching across the entire north side of the Llano is a sheer 100-meter-high, 200-meter-wide limestone headwall, the contact between the surrounding impermeable quartzites and schists and cave-forming limestone. At the base of this impressive feature is a 40-meter-wide, 15-meter-high black gash leading underground, the entrance to Cueva Cheve.

Beneath the awesome headwall, the tunnel expands to more than 60 meters wide by 30 meters high and descends along a gently sloping mountain of breakdown. The passage is so large that daylight may be seen from 500 meters inside the cave. Shortly beyond twilight, the gallery is punctuated by a series of 10- to 15-meter drops separated by

a meandering, tall canyon through which the wind howls. At a depth of 200 meters, an exposed traverse over a deep pit leads into the Christmas Present, a huge 30-by-50-meter rubble-floored gallery that parallels and lies above the descending stream-carved canyon. More and ever-deepening shafts lead off the bottom of the Christmas Present. The last empties into a 50-meter-diameter borehole, the Giant's Staircase, at -300 meters. This is a massive rubble slope that descends at the angle of repose for a remarkable 150 vertical meters. At the end of this boulder cascade is Saknussemm's Well, a 150-meter shaft. The gradient then diminishes, and a tall, narrow stream canyon is encountered at the -650-meter level. This section, known as the Salmon Ladder, contains numerous small cascades separated by deep pools of cold water. Beyond this, the water, now quite forceful, barrels down a spiraling, polished shaft with a resonant roar. This point, the Turbines, was the deepest point reached by Don Coons, Matt Oliphant, and Nancy Pistole during a December 1987 push.

By the beginning of April 1988, Cheve had been explored by the return expedition well beyond the Turbines, ultimately to a distance of nearly 6 kilometers from the entrance and a depth of 1038 meters [54]. All but one of those on the bottom team (Zeman, Stone, Smith, Blakeley, Holladay, Bob Benedict, and Matt Oliphant) had come from the Huautla Project. For many, including Zeman, who had come out of retirement for this expedition, Steele, Minton, and the rest, this was something of a reunion and an opportunity to resolve grievances that had led to the division of the Huautla Project in 1981. More mature in attitude and skill, with most in their late thirties now, all viewed Cheve as a site for renewed effort as a team. This was partly due to the growing acceptance that the days for significant exploration in the Huautla system on the north side of the Santo Domingo were numbered, at least until more advanced diving apparatus became available for work between the San

Agustín sump and Sump VII in Peña Colorada.

In the spring of 1989, Camp II was established in Cheve at a depth of 850 meters, 5 kilometers inside the cave. From this camp, three major pushes were launched during a total of twenty-three days underground. On the first, Jim Smith, Australian Rolf Adams, and Don Coons reached a depth of 1080 meters before running out of rope at a point some 2 kilometers beyond camp. Adams, Stone, and Benedict then returned to discover the kilometer-long Black Borehole, before being stopped at a major collapse. During the final nine-day push, Bill Farr managed to discover a route through the terminal collapse that opened into the A. S. Borehole, a kilometer long and 30 to 50 meters in diameter. Another major collapse halted exploration 9 kilometers from the entrance at a depth of 1195 meters. Subsequent work on the surface by Adams, Stone, Louise Hose, and Carol Vesely succeeded in connecting the 887-meter-deep Osto de Puente Natural to Cheve. This connection boosted the depth of the system to 1215 meters [55].

In the spring of 1990, Coons, Oliphant, and Stone set Camp III near the end of the A. S. Borehole and explored the most remote regions of the cave from their lonely outpost. Following a week of fruitless effort attempting to bypass the breakdown collapse, they were joined by Smith, Alan Cressler, and Laura Campbell. During the following three days, Coons discovered a continuation of a downcut stream canyon that had been the deepest known point in the cave. The team soon mapped more than a kilometer of new galleries leading northwest towards the Santo Domingo Canyon, before being stopped at a large sump at -1340 meters. The bottom of Cheve was now more than 10 kilometers from the entrance. A further week-long push from Camp III during the same expedition failed to crack the breakdown riddle, where strong wind disappeared into a 50-meter-wide collapse [56].

Prior to entering the cave on the

first camp push, Smith, who was now conducting a comprehensive hydrogeology study of the Sierra Mazateca and its environs as part of his masters thesis, had released eight kilograms of fluorescein dye. Eighteen kilometers to the northwest and 2600 meters lower, a second part of the expedition, led by Carol Vesely, was investigating the Cueva de la Mano, a dry resurgence-level maze cave discovered above the Nacimiento Río de Santa Ana. This spring had been reported by Stone and others as the Western Resurgence, which, during the 1984 Peña Colorada expedition, had been dived for 120 meters to a depth of 20 meters, with the 6-by-6-meter tunnel still continuing south. Cueva de la Mano was explored to a length of 7 kilometers, ultimately reaching one kilometer horizontally south of the canyon in the direction of Cheve. On the last day of their camp, two members of that team, Nancy Pistole and Sheri Engler, observed the spring running a strong, brilliant green. Smith had just achieved the world's deepest dye trace. There was a positive link with Cueva Cheve, 2600 meters above [57].

In December 1990, a small team led by Farr and Vesely attempted a return to Cueva de la Mano, but found the local political conditions to have deteriorated there [58]. They then returned to Cheve, where they continued exploration of Cueva Econdida, an obscure entrance 25 meters higher than Osto de Puente Natural that had been discovered by Minton in the spring of 1989. Minton's latest survey indicated that a connection to the bottom of the Puente entrance shaft was imminent. When Farr and Vesely completed the link, Sistema Cheve stood at 1364 meters in depth, taking the title of the deepest cave in Mexico from Sistema Huautla.

Fueled by Smith's dye trace results, extensive plans were made to place a six-person team of cave divers at the Cheve sump, to set a line through the sump, establish Camp IV somewhere beyond, and explore onward to, perhaps, -2000 meters. Compressed freeze-dried

provisions were prepared for an anticipated thirty-day underground assault. The cave divers, Smith, Stone, Coons, Farr, John Schweyen, and Jim Brown, trained for the expedition in the springs of north Florida during the fall of 1990. When the team arrived at Cheve in February, it was initially decided to support Schweyen on a fast-paced reconnaissance of the sump to determine exactly how much diving gear would have to be hauled to the bottom of the cave. Even a composite scuba tank, at 12 kilograms, is a substantial weight, considering that it had to be hauled through 10 kilometers of strenuous passage, including ninety-two ropes, to reach the sump. In addition to the divers, the team was joined by Oliphant, John Stembel, and Dan Clardy, who helped with equipment transport. During the course of what proved to be a seven-day trip based from Camp III, Schweyen dived the sump to a distance of 120 meters and a depth of 22 meters, where the 3-by-6-meter canyon split into several extremely small phreatic tubes that effectively stopped exploration [59].

Although Cheve now reached a depth of 1386 meters, the momentum behind the diving project came to an abrupt halt. Alternative plans were developed at Camp III for a renewed effort to find a bypass to the breakdown collapse, but they were never put into effect. On the way back to basecamp, the diving team discovered a note left at Camp II by three members of the surface team who had decided to attempt a trip to Camp III. The fourth member of their party, Chris Yeager from Indiana, never made it to Camp II. Following ten hours on the move with an eighteen-kilogram backpack, Yeager, apparently due to fatigue, forgot to lock a primary carabiner connecting his descender to his harness. While he was negotiating a rebelay on the thirty-third pitch, the carabiner unclipped, and Yeager fell 23 meters to his death. In the ensuing three weeks, a decision was made, based on careful consideration of the safety risks that would be imposed on the team in attempting to transport

the body through 5 kilometers of technically difficult passage and up 850 meters, to bury Yeager at the -800-meter level. Following the Christian burial, the cave was derigged in deference to the wishes of the family, who had flown to Oaxaca City and traveled to basecamp [60].

Yeager's body was finally removed from the cave in January 1992 by a group of forty-two cavers from the United States, Mexico, and Poland, working for two weeks, and returned to Indiana for reburial [61].

The southeast corner of the Huautla massif rises as an angular buttress nearly 1200 meters from the tropical lowlands near the town of Jalapa de Díaz. It is bordered on the south by the Santo Domingo Canyon and on the east by the Presa Miguel Alemán, a man-made lake that submerged most of the original Mazatec capital city, San Miguel Soyaltepec. A visitor to this area is struck by the vision of a sheer-walled limestone plateau rising up into a shroud of fog. The area was first visited by cave explorers during a month-long hike by Canadian Mike Shawcross prior to the 1970 expedition to Cueva de San Agustín in Huautla. Shawcross hiked from the town of Tenango at the end of the Huautla road and up into the cloud forest. Mazatec Indians in this area still harvest coaba (mahogany) trees with trunks measuring nearly 2 meters in diameter. In the heart of the area, known locally as Cerro Rabón, is the village of San Martín Caballero, from which Shawcross based many of his scouting hikes. These revealed an incredibly difficult, jungle-covered karst terrain to the south and west of the trail from Tenango, and so progress was limited. Shawcross left via a steep trail leading down the east face of the mountain, past the town of Cerro Central near the Presa Miguel Alemán. One of the more notorious incidents from this era occurred when Mike Boon, John Fish, and others returned to San Martín Caballero following Shawcross's recce. Having rented a stick and thatch

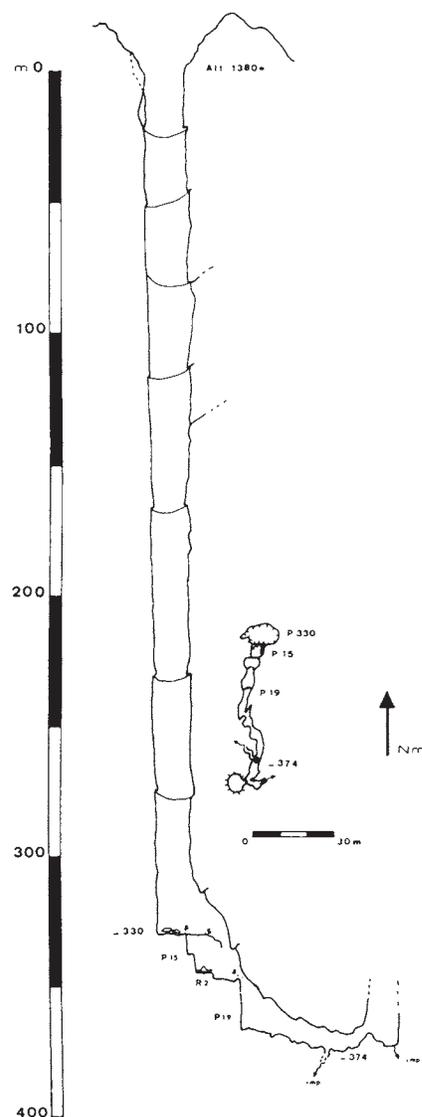
house, they had returned from a day's caving to find a hostile group of locals, some drunk, throwing rocks at them. They fled to the security of the house, whereupon one of the drunks began tearing the sides of the dwelling down. They spent a restless night taking turns guarding the door. There was the last view of the top of Cerro Rabón that cave explorers would have for fifteen years [62].

In February 1985, Ernesto Garza, Blane Colton, Laszlo Kubinyi, and Karlin Meyers ascended the trail from Jalapa de Díaz to reach San Martín Caballero, where they made initial acquaintances and found conditions to have dramatically improved since 1970. This can largely be attributed to a new generation of children, now adults, that had been educated in Spanish as public elementary schools, rudimentary as they were, reached into the most remote corners of the plateau during the last decade. Garza, Colton, and Meyers returned in December 1985 to continue reconnaissance work. The culmination of two weeks' scouting was the discovery on the ground of the Ojo de las Mazatecas, a giant 300-meter-diameter shaft that had been first seen during an aerial pass in 1978 by Stone, Steele, and others. The shaft was not descended. By February 1987, Garza and Meyers had organized a thirteen-strong American and Swiss team, drawing on relationships established during the Mt. Kajende expedition to New Guinea some years before. The team included Judith Ogden, Don Coons, Sheri Engler, Linda Gough, Urs Widmer, Jasmine Ustentag, Ursi Sommer, Philippe Roullier, Peter Keller, Pierre-Yves Jannin, and Christine Loosli. Basecamp was established near San Martín in a deforested doline. The weather that had created the amazing cloud forest to the southwest, they soon discovered, usually kept camp in a constant fog and drizzle. The team rapidly explored several locally known caves, including the 105-meter shaft at Nita Naxo, Sótano de San Martín, 245 meters deep, Sótano de Rolling Stone, 285 meters deep, and Nita Nia, 179 meters deep

and nearly 1 kilometer long.

When the weather finally cleared, the team was able to investigate the higher-elevation rain forest south of San Martín. This area, which reaches a maximum elevation of 2100 meters, was completely unexplored, even by the locals. The Ojo de las Mazatecas was finally bottomed by a party of seven, using roots and branches to climb down to the bottom along the north side. The famous pit, which had been estimated to be 250 meters

Sótano Tomasa Kiahua



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deep, was found to be blocked at the bottom. At an elevation of 1600 meters, the team discovered a closed, jungle-filled valley. Nita Oztotl, located at one end of this valley, is a spectacular vertical funnel that opens into a massive black void for a 120-meter free drop. Unfortunately, this promising beginning led to a blockage at -143 meters. The team was far more fortunate when, several days later, operating in the same region, Roullier, Jannin, and Ogden discovered a large double sink with a 40-meter entrance shaft. Unlike other Cerro Rabón caves, this one was formed in hard, black limestone of the type normally encountered in Huautla, and there was a strong wind blowing up from the depths. Meyers log describes what followed. "Pierre-Yves encountered a rift that appeared to have a pitch near the bottom. After several rock drops and several surprised double takes, he realized it was a full seven seconds before the rocks hit the bottom." When Roullier, Jannin, and Keller, the strongest of the Swiss team, returned, they discovered a spectacular 188-meter free drop. They followed several more pitches before running out of rope at -354 meters. Although no stunning accomplishment by Mexican standards, something momentous had happened on Cerro Rabón. Nearly all rainfall sinks immediately in this region through a uniformly porous surface. In order to form this new find, Kijahi Xontjoa (Mazatec for the Forgotten Door), a focus mechanism was required. And there was the wind [63].

When Keller, Meyers, Jeannin, Garza, and others returned in 1989, they came equipped to go deep. They would not be disappointed. In the course of several weeks, Xontjoa was pushed from the surface to a depth of 950 meters. A giant chamber rivaling Anthodite Hall in San Agustín was discovered at the -900-meter level. When their time was up, the cave was still going nearly straight down beneath the entrance collapse [64].

When the same team returned in the spring of 1991, six years after Meyer's initial reconnaissance, the

question was whether there was anything inside the heart of Cerro Rabón besides deep vertical-shaft systems. There was some substantial evidence to support the presence of large base-level galleries. In the fall of 1986, Noel Sloan and Bill Stone had conducted a lightweight diving expedition to the Nacimiento del Río Uluapan, near the village of San Bartolomé Ayautla at the base of the plateau in the Santo Domingo Canyon. This spring had first been visited by Sloan and others in the spring of 1978, after it was seen by several people during aerial reconnaissance in the early 1970s. Sloan and Stone dived 220 meters into the sump pool that began 150 meters inside the 60-by-20-meter entrance. To their surprise, the underwater tunnel averaged more than 40 meters in diameter, continuing north under Cerro Rabón. Whatever was supplying that tunnel had to be big.

Keller, Meyers, and crew decided on the unusual strategy of setting a lightweight three-man camp at the -900-meter level and rotating in a fresh team from the surface every three days. They ran ten such rotations in 1991. That the cave ultimately cracked one thousand meters depth was no surprise. What followed was. At -1050 meters, the shafts ended at the beginning of a 30- to 50-meter-diameter borehole that continued for a phenomenal 7 kilometers of horizontal galleries. They had hit the mother lode of the Cerro Rabón. When the last team had packed out, the depth was 1170 meters and still going. Most mysterious, however, was the fact that the survey revealed that they were heading northwest, towards Tenango, rather than toward the Nacimiento del Río Uluapan. Further work will verify, as some have conjectured, that Xontjoa will ultimately lead to springs, now submerged beneath the Presa Miguel Alemán, to the east of Tenango [65].

While the race for depth has been steady and heated in southern Mexico, the length record, following the connection in 1978 between Cueva del Brinco and Cueva de Infiernillo, has never left the north-

ern state of Tamaulipas. In the spring of 1979, Sprouse, Treacy, and others fielded another, two-month-long expedition to Sistema Purificación, during which several week-long efforts were based from Camp II in Infiernillo. These extended the length of the main system to 27.8 kilometers. A visit by Claude Chabert and others of the Spéléo Club de Paris culminated in the discovery of the Entrada de los Franceses, which remains the highest known point in the system. This connection boosted the depth to 893 meters [66]. Throughout the 1980s, the pressure for competition with the southern projects diminished, in large part because most of the depth potential in Sistema Purificación had already been attained, yet its horizontal extent was just barely beginning to be manifested. Expeditions to the Purificación area were, thereafter, generally fielded for several weeks each in the spring and fall.

By 1985, Sistema Purificación had reached a length of 51.2 kilometers, and Sprouse's theory of an integrated system reaching some 40 kilometers to the southern extents of the limestone highlands seemed promising. Sótano de Las Calenturas, located several kilometers south of Conrado Castillo, near the village of Yerbabuena, was discovered in 1979 on a long hike. By 1985, it had been explored to a length of 5.9 kilometers and a depth of 121 meters [67]. During the fall of 1985, a lead that had been known since the early 1970s, when it was discovered by Sheila Balsdon and Charles Fromen, began to see intense investigation. It was Cueva de Tecolote, near the village of Los San Pedro, on the eastern edge of the Sierra Madre Oriental south of Sótano de Las Calenturas. By November 1985, Tecolote had been pushed to a length of 7 kilometers. A year later, it was extended to 11 kilometers, with most passage averaging 20 meters in diameter. For diversity, Sprouse alternated pushes among these three major cave systems over the next six years. Sistema Purificación is presently [1996] 85 kilometers long and 955 meters deep, with 57 meters of the

depth due to diving in the Infiernillo sumps. Cueva de Tecolote was the target of an extremely successful expedition in the spring of 1991, during which 7.3 kilometers of new passages were discovered. Camp II, set nearly twelve hours from the entrance, was used as the advance base [68]. In all, Tecolote has been surveyed to a length of 32 kilometers and a depth of 424 meters (1996). The grand integration of Sistema Purificación, Calenturas, and Tecolote, if it can be achieved, would signal the formation of a system with well over 100 kilometers of passage, most of it the size of railroad tunnels, extending beneath the northern Sierra Madre [69].

It may be gathered from the above that the present hotbed of activity in Mexico lies in the environs of the three limestone massifs of the Sierra Zongolica, the Sierra Mazateca, and the Sierra Juárez. These three plateaus are all contained in a 200-kilometer north-south segment of the southern Sierra Madre Oriental on the east of the Tehuacan valley. The highlands have been dissected by the east-west canyons of the Río Petlapa and the Río Santo Domingo, north and south of Huautla. The Sistema Cheve area in the Sierra Juárez and two areas in the Sierra Zongolica, the Alcomunga karst highland and the Sierra Negra, including its parent mountain Cerro Zizintepitl, all present possibilities for the presence of caves two thousand meters deep. These areas are certain to see intense work throughout the next several decades. What then of Huautla? The maximum depth potential from the highest entrance of

Nita Nanta to the level of the resurgence is only 1639 meters. But the satisfaction to be gained from completing this grand traverse will likely be sufficient to compel those who have spent a good portion of their lives beneath the surface of that plateau.

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Historia de la Espeleología Mexicana

Este largo artículo trata la historia de exploraciones de cuevas en México desde en principio incluyendo proyectos biológicos y arqueológicos antes de 1940 y siguiendo hasta 1992. No se incluye el Proyecto Huautla; eso se trata en un distinto artículo in *AMCS Activities Newsletter* no. 21. En artículo fue escrito para la conferencia sobre espeleología latinoamericana en Vinales, Cuba en 1992.

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CHEVE 1995

Mike Frazier

Beavis punches Butthead. "Ouch!" said Butthead. "That sucked." "No it didn't," said Beavis. "That was cool." "But it hurt," said Butthead. "It's got to hurt to be cool," said Beavis. "Do it again," said Butthead. "Do it again."

The 1995 expedition to Sistema Cheve in Oaxaca officially began on Sunday, February 19. The main goal was to push the massive breakdown choke near the bottom of the cave. This area had been checked several times on past trips, starting in 1989, when the area was discovered by cavers working out of Camp II. In March 1990, Camp III was established in the AS Borehole, about half an hour from the terminal breakdown. During the first of two nine-day camps, cavers found the Wet Dreams section, about a kilometer of beautiful, clean-washed stream passage ending in a sump. During the second camp, cavers concentrated mainly on finding a route through the breakdown that ended the upper-level borehole, hoping to find a way to bypass the sump. In spite of considerable effort by both teams, no significant breakthrough in the breakdown was made. In 1991, efforts were concentrated mainly on a dive in the sump. Two deep camps pushed the breakdown in 1992, and two more in 1993, all of five to seven days each, but no significant progress was made. This is my personal narrative of the breakdown push in 1995.

This article appeared in the spring 1995 *Rocky Mountain Caving* in somewhat different form.

On Thursday, February 16, I inadvertently showed up a day early for my flight and ended up paying thirty-five dollars extra to leave Denver. I arrived in Mexico City and got a hotel room. On Friday, I visited a museum, then waited for Joe Ivy and crew in the airport until 1 A.M.

Saturday, February 18. After being introduced to Charley Savvas, Carl Blankenburg, David Shand, Gary McDaniel, and John Green, all from Texas, we packed my bags onto the already loaded-down vehicles and set off for Llano Cheve. We arrived at the Cheve parking area around 1 P.M. Saturday and met up with Matt Oliphant and Nancy Pistle from California. They had just arrived, after spending a couple of days in Oaxaca getting letters of permission. We spent the rest of the day carrying gear the kilometer to our camp in the *llano*, the meadow outside the Cheve entrance. Early the next morning, we began setting up the group-gear tents and rigging the tree for rebelay practice. The weather was overcast and soggy. Oliphant, Savvas, McDaniel, and I started rigging the cave to the top of Angel Falls.

Tuesday, February 21. Oliphant, Savvas, Green, and I rigged through the Turbines. When we were climbing the walls in the Salmon Ladders, Green slipped into a pool well over his head, submerging himself and his pack. It would have made a great action photo. On the way out of the cave, we ran into Angela Morgan and David Quillen from Georgia and Pete Haberland from New York, who were doing a warm-up trip to the top of Sak-nussemm's Well.

Wednesday, February 22. Ivy, Green, and Blankenburg taught a very thorough first-aid course, including how to administer IVs, the ins and out of tracheotomies, patient packaging, and more.

Thursday, February 23. Michael King from England and I headed into Cheve. We finished rigging to Camp II, ate a gourmet meal of freeze-dried food, and slept. Meanwhile, Savvas, Blankenburg, and Green went to scope out Cueva Palomitas, a gnarly little cave above Cheve's main entrance that had been discovered by Dan Clardy and Peter Bosted in 1991.

Friday, February 24. King and I woke up at 3:30 A.M. in Camp II. We finished rigging the cave to Camp III. Two drops before the Black Borehole area, we free-climbed a pitch where the rope seemed to be missing, and we finally arrived at Camp III around 10:30 A.M. We ate and took an inventory of the supplies in camp, then set off to find a lead in the breakdown that Harry Burgess had written about. After much contorted crawling and digging, all in the wrong places, we headed back to camp for some much-needed rest. The heel of my boot decided to go its own way, leaving me with a rather awkward cant. Ivy and Blankenburg did a warm-up trip from the surface to Sak-nussemm's Well, while Oliphant and Savvas carried food and gear to Camp II, placing a new rebelay on the way.

Saturday, February 25. We left Camp III at 6:00 A.M. for the surface. After repeating the climb at the Black Borehole, I located the missing rope and was able to rig it for King. We stopped at Camp II



Wishful thinking? Peter Haberland at Camp III. *Matt Kramer.*

for a hot meal and then pushed onward to the surface, arriving at 5:30 to watch a beautiful sunset. Oliphant and Savvas had reached the surface at about 2 P.M., and Haberland, Morgan, and Quillen made a trip in that day to stash gear at the top of Saknussem's Well.

On Wednesday, March 1, Taco van Ieperen from Canada and Ivy left for Camp II around 10 A.M. Matt Kramer from Minnesota, Ken Davis from Pennsylvania, Haberland, and McDaniel went in on a warm-up and photo trip at about 11 A.M. Oliphant and Savvas left for Camp III around noon.

Thursday, March 2. Long Bob Riley and Peter Hartley, both from England, and Denis Provalov from Russia arrived at the *llano*. That evening, King and I headed in to Camp III. Ivy and van Ieperen left for Camp III from Camp II. Meanwhile, Oliphant and Savvas worked on setting up Camp III for the rest of us.

Friday, March 3. King and I rolled into Camp III just as the P.M. shift was getting ready to head out to look at the breakdown pile. There were seven sleeping bags, and four-

teen people were planning to show up at Camp III. We arranged a schedule that gave everyone a twelve-hour shift with a sleeping bag, which worked out pretty well. I grabbed a quick bite to eat and also went to the breakdown. King found an unoccupied sleeping bag and opted to sleep. Ivy and Oliphant looked for high leads, while van Ieperen, Savvas, and I crawled in and out among the breakdown blocks.

Saturday, March 4. Ivy and van Ieperen set out to check a lead in the Cowboy section. They surveyed thirty-two stations before it ended in a breakdown choke. Savvas, Oliphant, and I once again began pushing hard at the breakdown pile, with little progress. At one point, Oliphant and I had to leave the area we were working in to refill our carbide lights. On the way back, Oliphant took a series of wrong turns in the complicated pile and could not find us for two hours. He swore he would bring a dive-line in to avoid getting lost again.

Sunday, March 5. As usual, back to the breakdown. Savvas, Oliphant, and I laid the line and pushed, while Ivy, van Ieperen, and King surveyed behind us. By the time they caught up, Savvas had managed to work his way through a squeeze into a sizable area among the massive blocks. We realized that this area was virgin. After we "Ivy-sized" the squeeze so Joe could get through, we began pushing the area hard, but we didn't make much more progress that day, unfortunately.

Monday, March 6. Motivation to return to the breakdown pile was dwindling. It was hard work checking leads. However, there was an encouraging flow of air into the breakdown, hence the jokes about how the cave sucked. Van Ieperen and King decided to do a sight-seeing and photo trip to the Mud-Floored Borehole. Ivy and Oliphant decided to check in the vicinity of a side-lead that parallels the breakdown maze for a good distance. Savvas and I planned to go back into the breakdown to have one more look before derigging a rope. I guess Savvas and I were in a mas-

ochistic mood. Savvas, Oliphant, Ivy, and I ended up procrastinating for a few hours before going our separate ways. It was starting to look like a mellow day. We couldn't have been more mistaken. Savvas and I got to the last survey station. We split up for a few minutes, and then we both called out that we had found ways on. Savvas decided to come up in my direction, which was very tight and icky. We were passing through a medium-size breakdown room some distance above the last one when Savvas paused and said, "Hey, I've been here. But it was easier my way." Sure enough, there was his rock cairn. Together we went upward, taking turns dilating our dream passage. If only we could penetrate this seemingly endless pile of oversized marbles into a chamber with a solid roof. It looked a little darker than usual in an adjoining chamber, so we crawled under a rock to see. "Whooo, Charley, yes, yes. Borehole!" Savvas was still diligently laying out dive-line, which he ran out of only a couple of steps into the chamber. Savvas was quite torn. The guideline was our route back through the pile, and it took a few moments for him to let go of it. Once he did, we began hopping about like mad children, throwing rocks into the air. This was short-lived, however, when we discovered subterranean gravity. We decided to make a big cairn, then to stay within view of the right wall and work our way downhill to glory. Seeing the walls wasn't a problem, and the floor was relatively flat. The area was decorated with soda straws and flowstone. Five minutes later, we reached the end of the borehole. It turned out our borehole was nothing more than a big 200-meter-long room. But it sure beat the breakdown.

We decided we would have a bit of fun before we let the others in on our find. Walking up to Ivy and Oliphant in camp, we did our best to look exhausted, taking turns cursing the pile of rocks. I swore I had had enough of that, and my body could take no more. Neither of us could look them in the eye, though, as they asked questions,

which each of us answered differently. When Oliphant asked which wall we had been working, Savvas said right and I said left. They caught on that something was fishy, and we let them in on our game. At first they didn't believe us, but finally the news sank in. We had run out of time on our shift, so the A.M. shift would survey and push.

Tuesday, March 7. We woke up at 11:30 A.M. We looked at the survey of the new find that had been made by Haberland, Kramar, and Davis. The sketch was nice. Then we got the run-down on how the push had gone. Provalov and Long Bob had pushed muddy tubes on the right side of the room and, a bit, in the breakdown on the left side. After comparing the new notes to the map, we found that one side of the room lay directly over known cave. Although the room had been surveyed, we decided to take another look. Ivy, who wasn't into the tight breakdown, stayed in camp, intending to head out with some-

one during the next shift. We got to the beginning of the main breakdown about 2 P.M. and to the new room about 6 P.M. After lunch, we began probing and moving rocks in the new rock-pile. The prospect was looking pretty grim. The solid-bedrock, sloping ceiling and the wind were all that kept us going, but by the time we had to head back, we hadn't found much. Back at camp, we learned that van Ieperen and King had already left and Long Bob would be heading out with Ivy. They left for the surface about 2 A.M.

Wednesday, March 8. My shift woke for breakfast. Oliphant and Savvas were talking about going back to Camp II for more food and fuel. Then we found a new can of fuel that had apparently reached camp unassisted. Morgan and Quillen solved that mystery when they appeared out of the overflow area of the camp. We now had fuel, and I had carried enough food to last us for three more days. This,

along with the rations donated by the ones who had left, would feed us all well. Morgan and Quillen had met van Ieperen and King at Camp II and Ivy and Long Bob at the constriction in the Looking Glass. We traded snacks, then talked and ate all day. At one point, Oliphant walked up with a serious look on his face and said, "That's one big breakdown pile. Do you know what we need for big breakdown? A big hammer!" Then from behind his back came a 3-foot-tall inflatable plastic hammer, with which he proceeded to pound our heads.

Thursday, March 9. Haberland, Davis, and Kramar arrived back at camp. They poked and surveyed a bit and took many fine photos. They were discussing leaving for Camp II on Saturday. We, along with Morgan and Quillen, left for the breakdown. At the end of the day, we found an area with flowstone, taking wind, though badly choked with rocks.

Matt Kramer on a traverse in the Swim Gym.
Ken Davis.



An interesting climb in the Cowboy Passage.
Ken Davis.



Friday, March 10. Provalov and I were the first to arrive at the push site. After rolling a few rocks aside, I attempted to take a closer look up a 3-meter chute. Without warning, the right wall collapsed, trapping me uninjured with my face against my knees. My calls for help were somehow interpreted by the others at announcing a breakthrough, and they all came running, only to find more work. After they got me out, we found that it was now possible to climb up into a small chamber with formations, where only Provalov was small enough to make the squeeze up into another room. By digging from the top down, he was able to make it possible for the rest of us to proceed. From here, the wind was going up through the nastiest stuff we had encountered yet, the grimmest of the grim. You

could even go so far as to say it sucked. Oliphant and Savvas went back down to the big room to refill their lamps and eat. Meanwhile, Provalov and I set to work on the tightly packed muck. Before long, we were back to crawling through boulders. Just as Provalov was preparing to go after a crowbar, I noticed a beckoning blackness through the rocks. Soon Provalov and I were hearing echoes in a chamber even larger than the last. After placing a cairn, we found the left wall and worked our way along it past an aragonite bush, some helictites, and a nice set of columns. Provalov volunteered to go back and tell Oliphant and Savvas about our find, while I continued to look around. After a while, I worked my way over to the right side of the room. Lost for a while among the

large breakdown blocks, I finally found the columns we had admired earlier, but I still had no idea exactly where we had entered the room. I must admit that I was relieved to see Provalov's light again. The others had said they'd wait while we looked around. I couldn't believe that the others did not want to see this. Our lights also needed recharging, so we decided the room would have to wait. When we got back to Savvas and Oliphant, it turned out that they had misunderstood Provalov about the dimensions of the new room, and plans for heading back to camp were abandoned. We all ate snacks and headed for the new room, the Gypsy Palace. We looked around for a few hours and found a climb up through breakdown to a soccer-ball-size restriction with big blackness beyond. Having no crowbar, we had to leave this lead until the next expedition. It was 2:30 A.M. when we arrived back at Camp III. There we said goodbye to Davis, Kramar, and Haberland, who were leaving for Camp II.

Saturday, March 11. Morgan and Quillen packed and headed for Camp II. To avoid queues at the drops, Savvas, Provalov, Oliphant, and I stayed to clean up camp, leaving several hours later. Provalov and I split up from Savvas and Oliphant at the start of the Looking Glass. On the way back through the Hall of the Restless Giants, we found a note from Peter Keller and Christian Preiswerk of Switzerland. They had been doing core samples to date the formations and were asking for help in carrying out six drill extensions. After dividing them among ourselves, Provalov and I once again were on our way. Before long, one of them fell out of Provalov's pack and down a baseball-size hole. Although we searched for forty-five minutes in gnarly and presumably virgin passage, we had no luck in recovering it. When we arrived at Camp II, we heated a meal. Haberland, Davis, and Kramar then got up, ate, and started the trudge out. Soon after



More interesting climbing in the Cowboy Passage. *Ken Davis.*

that, Oliphant, Savvas, Morgan, and Quillen arrived at Camp II. The Swiss team woke up and gave us a few more items to carry out. Provalov and I left for the surface.

We got out of the cave and into the llano about 11 A.M. on Sunday, March 12. It was a beautiful day, and it felt good to see sunshine. By evening, everyone was out except the Swiss, so we had a big fire and bull session after dinner. Our job was not over, though. In the next week we would have to derig the cave and pack everything away for the next expedition. But at least for one night we could brag about our accomplishment, finally getting somewhere in the terminal breakdown, where we had surveyed 224 meters. The last room was not surveyed. All of the new passage went up, a total of 80 meters from the tie-in station, so the cave's depth still stands at 1386 meters. We are hoping that the climb up through the breakdown will eventually lead to open passage going down.



Peter Haberland in the Swim Gym. *Ken Davis.*

Sistema Cheve 1995

Durante la expedición Cheve en la primavera de 1995 los cueveros que permanecían en el profundo campamento III pasaron varios días en explorar los derrumbes terminales. Al final de el viaje se habían encontrado grandes salones a 80 metros sobre el fondo de los derrumbes. Estas son buenas posibilidades para investigaciones futuras.

PAST CAVE EXPLORATIONS IN THE TEQUILA AREA, VERACRUZ

Peter Sprouse

In preparation for the 1995 expedition to the Tequila area, I did fairly extensive background research on what had been done there previously. In doing so, I gained an overall view of the history of exploration around Tequila, and I also uncovered some unpublished cave maps. The results are presented here. For the sake of convenience, I will organize things by the nationality of the explorers, but comparisons among the accomplishments of various groups is not the intent. Nationalism sucks—we are all cavers.

North American Explorers

The first visit to the Tequila area by cavers was almost certainly by T. R. Evans and Steve Plasky in June 1962 [1]. After having failed to gain boat passage to Europe from the port of Veracruz, they fled the coastal heat to the relative coolness of Orizaba. Inquiries about caves soon led them to Tlilapan, just south of Orizaba along the road to Tequila. They explored several caves, including a resurgence that they called Cueva de Agua. A cave in a cliff face above Tlilapan that was visible from the road, Cueva Arriba, was also explored, but it was only a short guano cave. Upon arrival in the town of Tequila, they immediately located several deep pits, some of which were explored during a follow-up trip in November 1962 [2]. A pit at the fork in the road, Sótano de El Crucero, was found to be 111 meters deep. This was explored using half-inch nylon rope and prusik knots. Another deep pit, Sótano de Oztoatlícholoa (or Oztatliltaloa) was descended by Terry Raines and TR, and the

cave was found to continue down several more drops. It was surveyed down seven or eight drops to a depth of 183 meters on a follow-up trip by David McKenzie and Terry. It finally reached a breakdown choke at about 206 meters depth. Left unsurveyed was an upstream passage off the bottom of the entrance drop that was explored for 300 meters to a 30-meter-high dome. Another Tequila-area cave surveyed by McKenzie and crew was Cueva de las Trozas.

In June 1964, Bill Bell and Terry Raines returned to the town of Tequila to continue checking the many local pits [3]. Upon arrival, they were told that a local teacher had recently been thrown down a pit to his death. The remainder of the trip was consumed with recovering the body, and Sótano del Profesor was not surveyed.

In December 1969, John Fish led a group of Canadian cavers to continue exploration southwest of San Andrés Tenejapa, just north of Tequila [4]. Sótano de las Tres Peñurias was surveyed down several drops to a pinch at –183 meters. A few hundred meters higher on the hill was Sótano de la Milpa, previously explored by Terry Raines. It has a 146-meter entrance shaft and a total depth of 152 meters. One hundred meters away in the same dolina was Sótano de las Ranas, where Raines had heard a stream from the top of the second drop. Below the third drop, they found that it pinched in a narrow rift at –168 meters. Continuing on to Tequila, they visited Cueva de la Cascada to check a pit lead left from a previous trip. This turned out to be a 23-meter pit into a large room

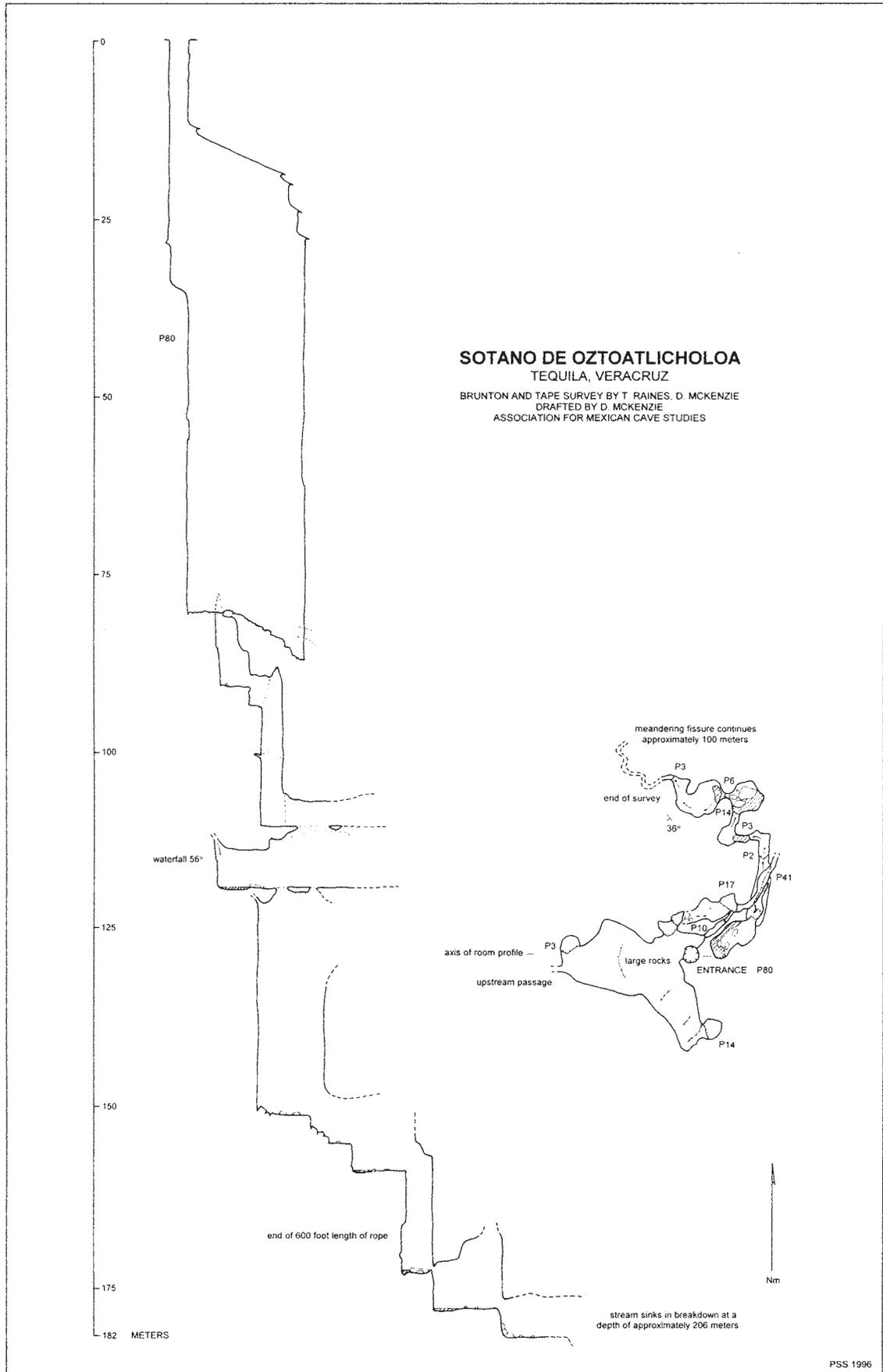
with sumped exits. From the entrance area of Cascada, they pushed the stream passage for 900 meters to a sump.

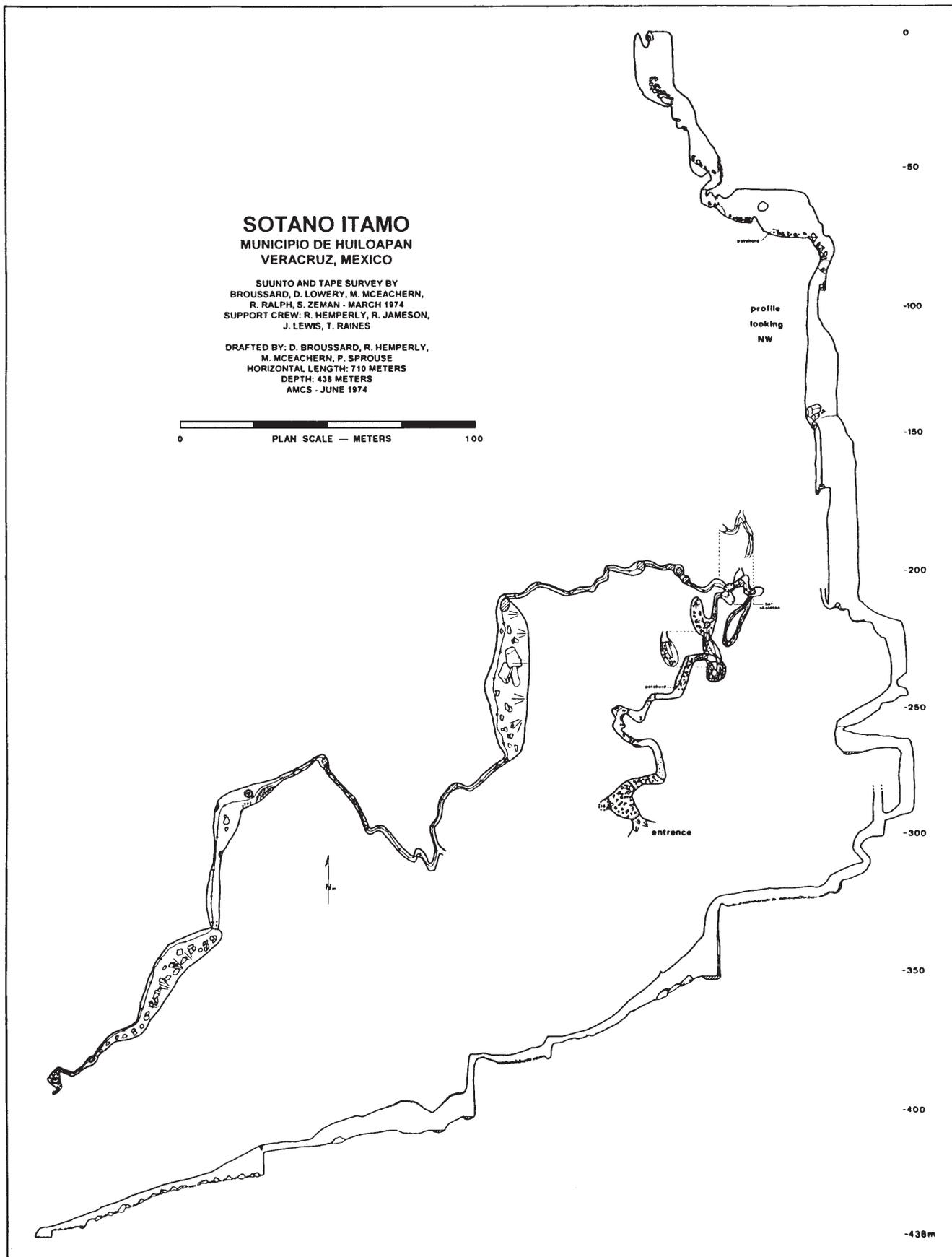
In the late 1960s, members of the Philadelphia Grotto began investigating the high karst south of Ciudad Mendoza [5]. In December 1970, an expedition organized by Warren Heller explored a number of caves around Soledad Atzompa. The deepest of these they named Cueva de Cerro, and they surveyed it to a depth of 454 meters. This cave was surveyed again in June 1974 by a group of Texas cavers. They applied the name Sótano Itamo, and measured the depth at 438 meters. James Reddell and other Texans found a number of promising caves around Soledad in January 1974 [6]. Most of these took water and led to vertical drops, but they were not completely pushed or mapped.

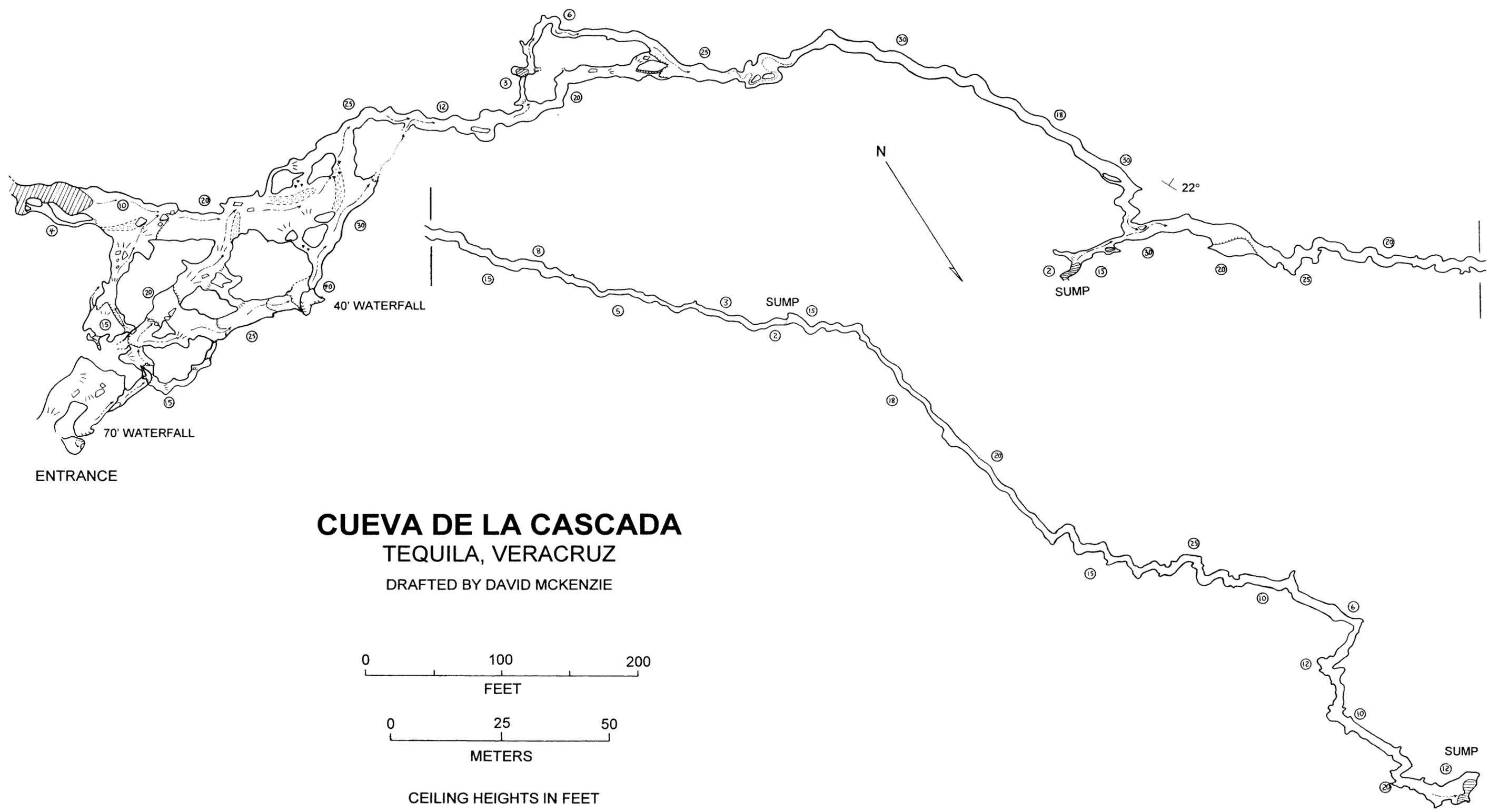
Mike Warton led a group of Texas cavers to recon the Sierra Modelo (Zongolica) east of Zongolica in 1985 [7]. When only minor caves were found in that area, the group moved west to Temaxcalapa. In a stream cave named Olbasco, they ran out of time after 908 meters, at a depth of 215 meters. This cave was later surveyed by Belgian cavers to –240 meters and explored even farther. It is not clear if the cave was ever finished.

Mexican Explorers

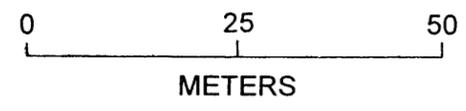
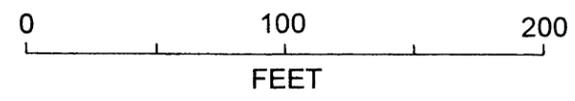
Mexican cavers began caving around Tequila sometime prior to 1974, as evidenced by the description of a small Tequila cave in the publication *Oztotl* of the Grupo de Investigación Espeleológica. Beginning in 1981, cavers of the Sociedad



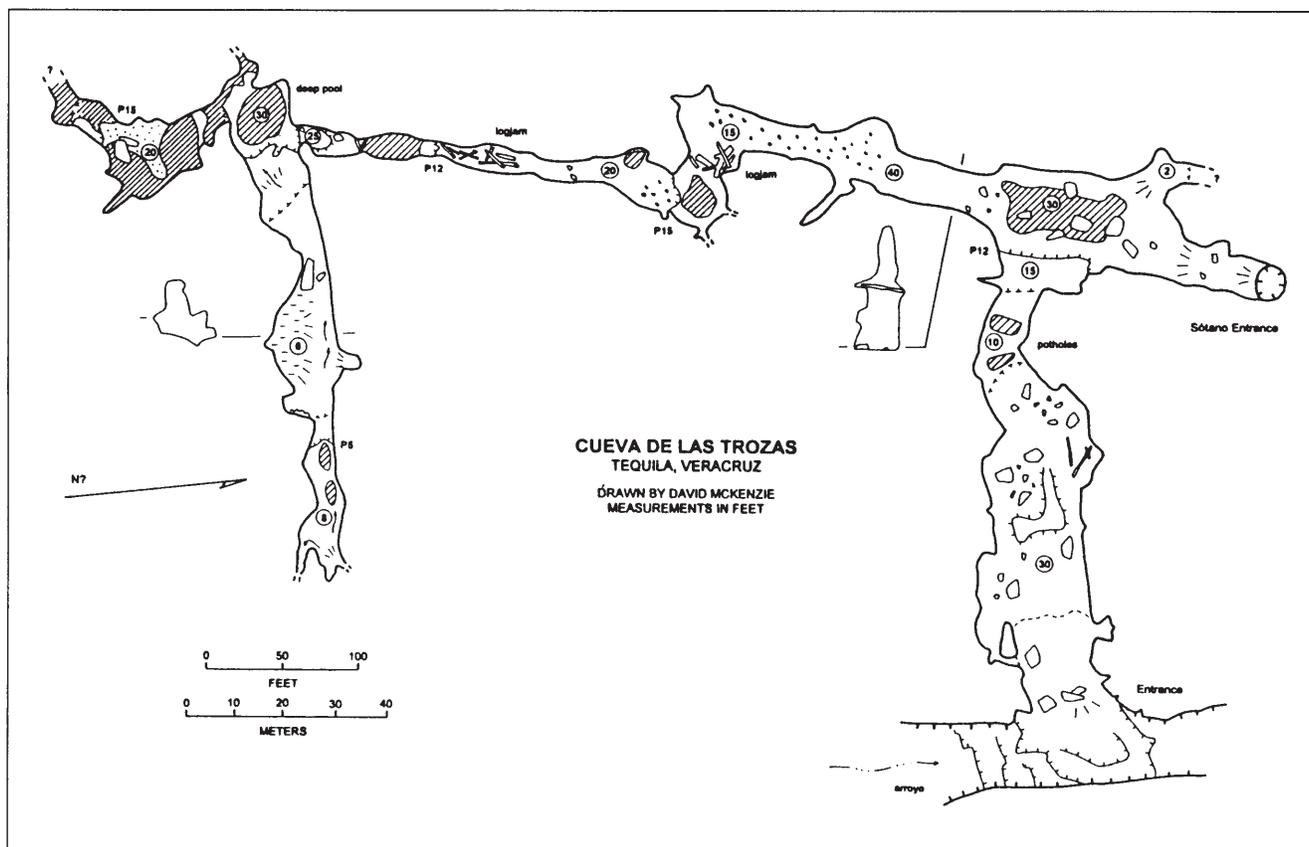




CUEVA DE LA CASCADA
 TEQUILA, VERACRUZ
 DRAFTED BY DAVID MCKENZIE



CEILING HEIGHTS IN FEET



Mexicana de Exploraciones Subterráneas joined the French expeditions in Zongolica, and later split off to explore Ahuihuitzcapa.

Belgian Explorers

Cavers of the Groupe Spéléo Alpin Belge began working the Zoquitlán area in northern Puebla in 1982 [8]. In a series of expeditions over the next ten years, Belgian cavers explored some major caves in this area, including 19-kilometer-long Coyatl and 1200-meter-deep Akemati. Some of their explorations spilled over into Veracruz. In 1987, the Equipe Spéléo de Saint-Nicholas did extensive prospecting around Zongolica, Tequila, Atlahuilco, and adjacent areas. Some 120 caves were documented on this expedition, including 438-meter-deep Sótano del Pueblito near Texhuacán. This group explored some caves near Atlahuilco and did a brief reconnaissance through Tlaquilpa, the areas later explored by the American Tequila '95 Expedition. The Belgian report [9] constitutes the major reference on

caves in the Tequila area.

British Explorers

A large number of British cavers participated in the 1988 Black Holes Expedition, which concentrated on the Sierra Modelo [10]. Sótano de los Hermanos Peligrosos, 391 meters deep, was the deepest cave found in that range. Sumidero de Xochiotepec was mapped to 2150 meters in length before a blowing pinch stopped them. To the west of Tequila, some caving was done near Soledad Atzompa. Sumidero Oxtotempa (also known as SOL 2) was explored to 2000 meters length and 205 meters depth.

French Explorers

In 1977, cavers from the Spéléo Club de Paris were taken to the Zongolica area by Jorge Urquijo de Tovar of the Grupo Espeleológico Mexicano [11]. They looked at the entrance to the Atlalaquí de Atikpak river cave and its resurgence at El Precipicio, 395 meters lower, deeming it a dangerous undertaking. The following year, Phillipe Ackermann and other

French cavers began the challenging exploration, reaching a sump at -320 meters in 1980. Northeast of Tequila, they located the impressive Sumidero de Popoca, where a large river plunges into a 60-meter shaft. They and cavers from the United States explored this in 1981. One of the deepest shafts in Mexico, 330-meter Sótano de Tomasa Kiahua, was explored at San José Independencia. Lower down, near Comalapa, another large river cave called El Boquerón was explored. Its 170-meter-tall entrance could be the tallest in Mexico. Also discovered was 455-meter-deep Ahuihuitzcapa. Something of a scooping war developed over Popoca and Ahuihuitzcapa between the French and Mexican cavers.

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Historia de exploración de cuevas Tequila, Veracruz

Las primeras exploraciones de cuevas de Tequila, Veracruz se iniciaron por cueveros de T́exas que visitaron el ́rea en 1962. Se describen otras exploraciones, incluidas las de cueveros mexicanos, belgas, ingleses y franceses, y aparecen varios mapas que antes no se han publicado.

BOOK REVIEW

Proyecto Cerro Rabón 1990-1994 (Oaxaca, Mexico). Thomas Bitterli, ed. Speleo Projects, Basel, Switzerland; 1996. 192 pp. ISBN 3-908495-02-4 (hardbound), 3-908495-03-2 (softbound). Available in the United States for \$36 (soft) or \$54 (hard) plus \$4 shipping from Speleobooks, Box 10, Schoharie, New York 12157.

This is a second, much larger report on the joint Swiss and American project on a high limestone plateau in the Sierra Mazateco in southern Mexico, an area just east of the more famous Huautla. Among the caves in the area is Kijahe Xontjoa, which, from your choice of 200-meter-pit entrances, drops nearly straight down for some 800 meters to open into a collection of large rooms and passages. After the 1993 expedition, the latest covered in this report, its depth was 1181 meters, and its length was 19 kilometers. (After the 1995 expedition, Xontjoa is 1195 meters deep and 25 kilometers long.) The earlier report, published in 1990 for the period from 1985 to 1989, is 58

pages long, so this new report is indeed much more substantial. It also sports color photos on the covers, the back one being a photo of the Xontjoa entrance by long-time AMCS caver Ernie Garza.

The first 72 pages of the report are general chapters on the history of the project and its scientific results. Besides the geology, biology, and archaeology of the caves, the project has been interested in the local culture and the mountain forest and its conservation. These chapters are in English and either French or German. The rest of the book is cave descriptions and maps. The detailed cave descriptions are in French, mostly, or German, with only short area summaries in English. This mixture of languages is no doubt congenial to the Swiss, but it will certainly cut into the American readership, not to mention, even more importantly, the Mexican audience for this important book. But all the photograph captions are translated into English, and of course the cave maps do not depend on any language.

The many black-and-white photos are generally very well printed, although a few of them have been computer-sharpened a bit too enthusiastically, perhaps. There are dozens of well-drafted, highly detailed cave maps. The map of Kijahe Xontjoa consists of seven pages of plans and seven pages of profiles. Unfortunately, some of these have been spread across two pages without adequate binding margins, and some of the profiles are extremely confusing. In a profile, clarifying overlapping passages by using vertical offsets is a Very Bad Idea. I also wish they hadn't been too cheap to include the couple more pages of maps of the older parts of the cave. As it is, one must have both reports to have a complete map.

Information on too many major caving areas in Mexico is available only in scattered articles. It is nice to see this detailed report on the Cerro Rabón. Perhaps it will inspire people to work on those AMCS bulletins on some other areas that I keep hearing rumors about.

—Bill Mixon

1995 TEQUILA EXPEDITION SIERRA ZONGOLICA

Pat Kambesis
with contributions by Jim Smith

The 1962 account by T. R. Evans of his journey south of Orizaba and into the town of Tequila and his description of the karst in and around that area sparked interest in the cave potential of the Sierra Zongolica. A quick perusal of the topographic maps shows a mountain range that is cut by deep karst valleys and studded with numerous sinks and big dolines. The range is drained by vanishing streams and rivers that emerge kilometers later to form base-level rivers that wind their way to the coastal plain. This awesome physiography has inspired a number of expeditions, and over the course of the last twenty years the greater Zongolica area has provided spectacular vertical caves, some over 1000 meters deep, and many shafts, some in the range of 200 to 300 meters deep. [See also the article on previous explorations in the Tequila area in this issue.]

In March 1995, Peter Sprouse and I led an expedition to investigate a high karst area southwest of the town of Tequila. At elevations between 2000 and 2700 meters, the high peaks in the area were apparently still untouched by cavers. The expedition roster included a good cross-section of ridgewalking animals, survey mongers, and incorrigible pit boppers, all of whom got plenty of opportunity to indulge themselves during the course of the expedition. A strong contingent of cavers from the United States was joined by Mexican cavers from

Veracruz. The expedition was nicely rounded out by a touch of Brit and a little bit of German. Peter Sprouse worked with the Veracruz cavers to secure letters of permission and to make arrangements for setting up a base camp in the town of Tlaquilpa.

On the rendezvous date of March 20, 1995, I rode up the mountain to the Tlaquilpa base camp with the wild and dangerous Sotona sisters in caravan with the ever-dependable Doug Strait and Indiana herpaphile Theodore Wilson. The Veracruz cavers, Carlos Altamirano, José Benjamín Cruz, Andres Girón, Ivan Aguilar, Carlos Solis, and Vicente Fuentes from Espeleo Veracruzana, had already arrived and were setting up camp. A small group from the Cheve expedition, Joe Ivy, Charley Savvas, and Gary McDaniel, were looking svelte but sunlight-deprived after having spent days at Camp III in Cueva Cheve. Later in the day, we would see the unrelated but expeditionally pair-bonded James Harry Smith and Marion O. Smith.

While the rest set up camp in the pine forest of Tlaquilpa, Doug, Benjamín, and I ventured north to try a little ridgewalking. Actually, we just hiked up the road looking for road-side pits, and we were rewarded. Though a nerd-hole by Mexico standards, at 45 meters deep, Sótano Mojonera was a nice little find, with two entrances nestled among a small forest of trees and exotic plants. A small *capilla* (shrine) was located in front of a neat pile of logs near the pit. We

had some fun with the rigging and tagged, mapped, and photographed the pit, and had enough time to look for another. A leisurely 1.5-kilometer stroll led to another road-side pit, Sótano de Tlaltemango. Actually, it was two *sótanos*, a 36-meter blind pit and a smaller, 6-meter-deep companion. We finished up in the late afternoon and headed toward Tlaquilpa.

Back at camp, the rest of the expedition was arriving in force. Peter Sprouse, Susie Lasko, Peter Quick, Pete Hollings, Bernard Köppen, Linda Palit, and Javier Trevino arrived in an ancient military vehicle. Ron Simmons and Mike and Andrea Futrell pulled up in a shiny-looking Toyota. And Teresa Williams made a solo entrance in her road-warrior truck. Peter Sprouse was quick to pull out the topo maps, aerial photos, and stereo-pair glasses so that we could all ogle the karst topography in 3-D. The air photos showed a mountainside pock-marked with lots of good pit potential, impressive-looking karst valleys, and streams of water that seemed to sink everywhere across the high limestone.

The next day after breakfast, three groups took off to the hills north of town for some good old-fashioned ridgewalking, and one team headed southeast in search of a sinking-stream lead several kilometers away.

Though only a few clicks on the map, it was nearly an hour's drive to the sink of the stream, which, according to the topo map,

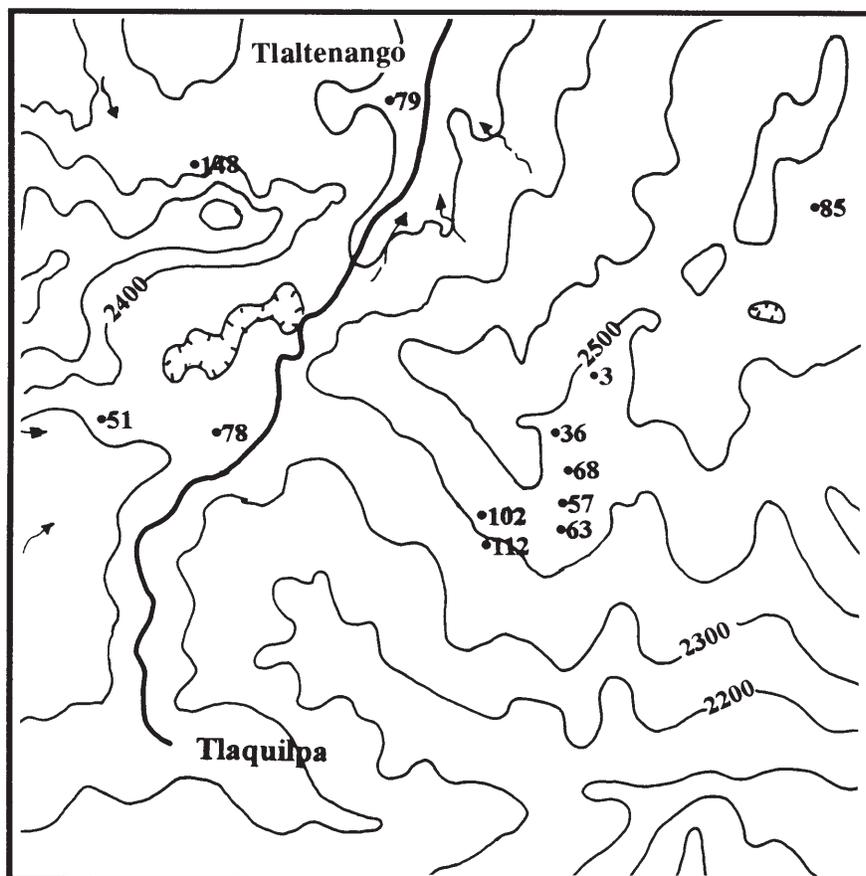
The material by Jim Smith has been extracted from an article in press in *Georgia Underground*.

vanished on one side of an oval depression. But what looked great on the topo was a bit of a disappointment in reality. A stream did flow across impermeable rocks down the mountain, into a sediment-lined channel, and then it unceremoniously sank into a small, unenterable hole at the base of a limestone bluff. A second, overflow sink-point was located several meters to the south of the main sink. This feature could be entered, but it soon became a dig. According to the locals, in the wet season there is a lake in the depression. A half-hearted attempt was made to dig out the second entrance, but no one was in the mood to get totally slimed. While Gary worked on moving out some debris, Doug and I combed the limestone bluff for entrances. Peter, Susie, and Benjamín hiked on in search of other leads.

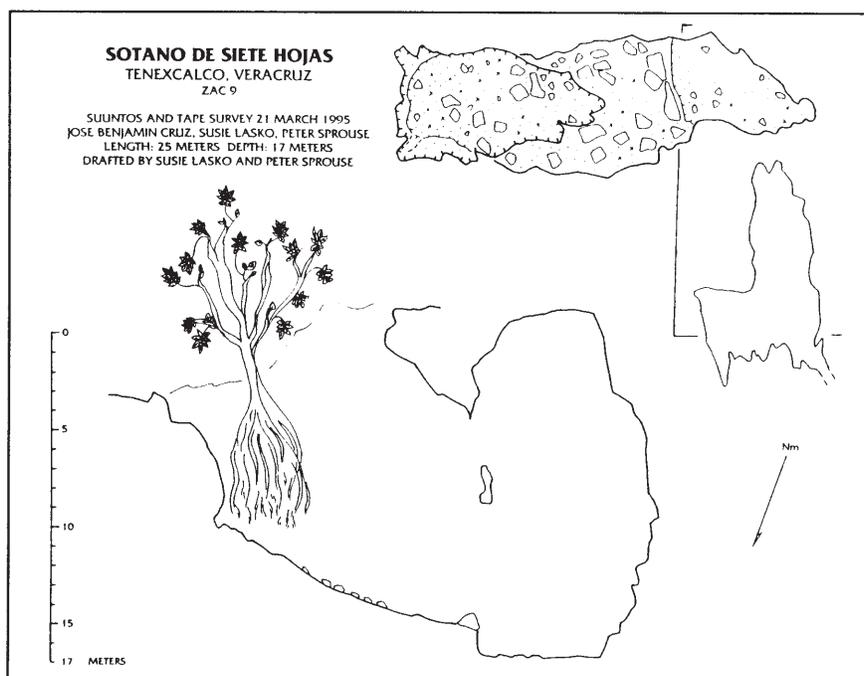
Our efforts on the bluff face were rewarded, though not hugely. An inconspicuous little blowhole hinted at cave within the bluff, and Doug did find a walk-in entrance. Cueva de Zac, a narrow fissure cave, went all of 38 meters and ended in an impassable rift. Daylight from the higher reaches of the fissure indicate another entrance, but not of a size that we could fit through. We did a quick survey and then hit the cliff-side again, finding Cueva de Zaquito, 12 meters of tight fissure that ended even tighter.

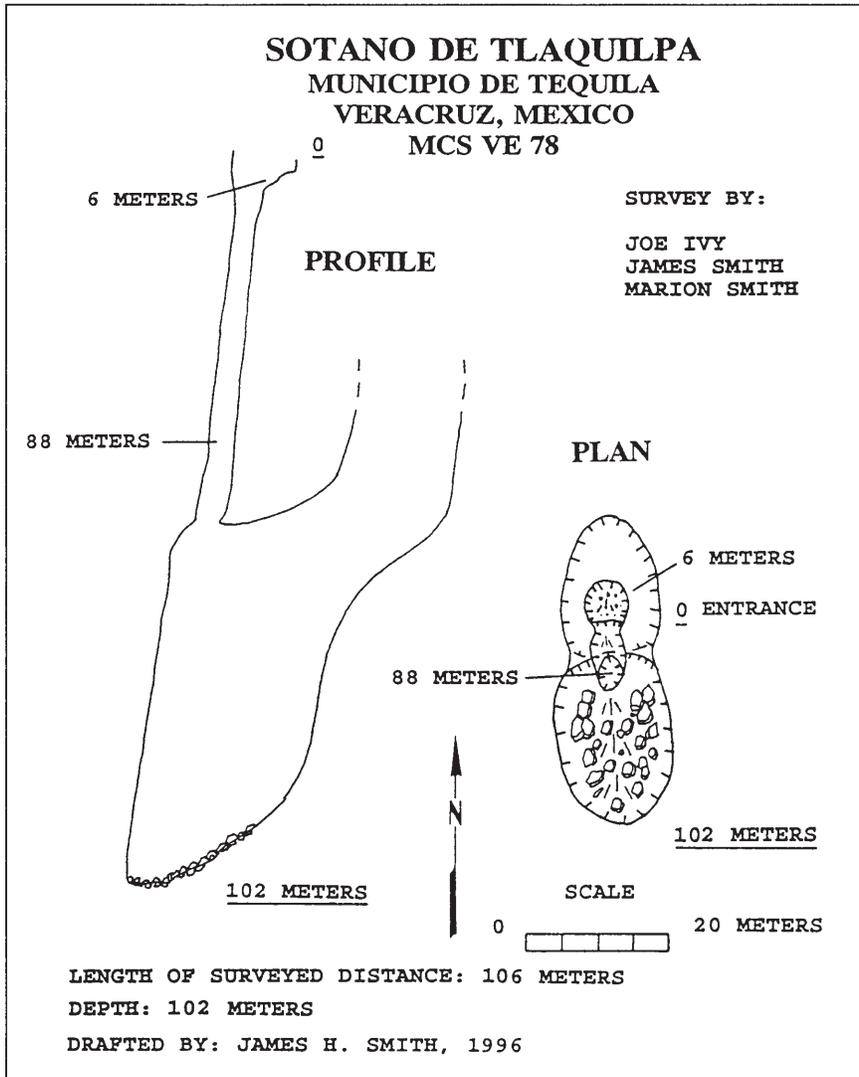
When those surveys were complete, we met the others near the sinking stream. Peter, Susie, and Benjamín reported that they mapped Sótano de Siete Hojas, a pit located northeast of the local school, on a small hilltop. The entrance measured 5 by 10 meters and had a fig-type *siete hojas* tree growing up one wall of the pit. The 7-meter entrance pit lands in talus, which goes down to a flat dirt floor at a depth of 17 meters.

While Peter and Benjamín talked to the locals, Susie pointed us to a small cave entrance across the depression that she had explored. With survey tape in hand, Doug, Gary, and I mapped the little rift cave, which the locals called Cueva del Diablo. A short through-trip



Tlatenango-Tlaquilpa Area: 3. Sótano de Pago Pago. 36. Sótano de Poncho. 51. Sótano de Tlatenango. 57. Sótano de Dos Acróbatas. 63. Sótano de Sapo Chiquitico. 68. Sótano de Hombre Miedoso. 78. Sótano Mojonera. 79. Sótano de Tlatenango. 85. Bug Sucks Gnat Hole. 102. Sótano de Tlaquilpa. 112. Cueva de Troza. 148. Cueva del Cráneo de Cabra.





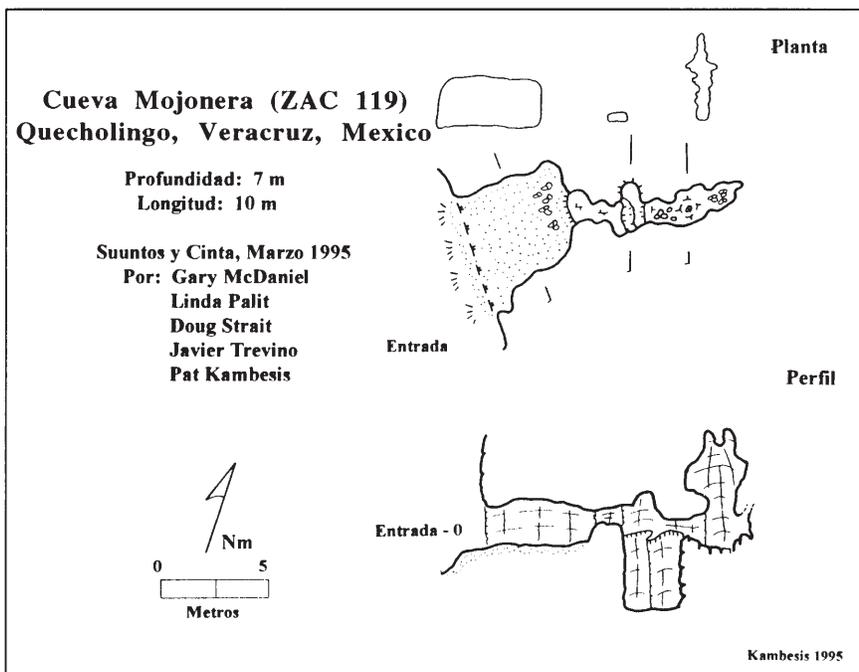
ensued from the Prince of Darkness entrance to the upper 666 entrance, a total of 18 meters. The locals wanted to take us to one more cave, just down the valley. They didn't have a name for it, and from the looks of the thick mud covering, this cave also takes water during wet times. We explored perhaps 50 meters of cave before it came to a definite end.

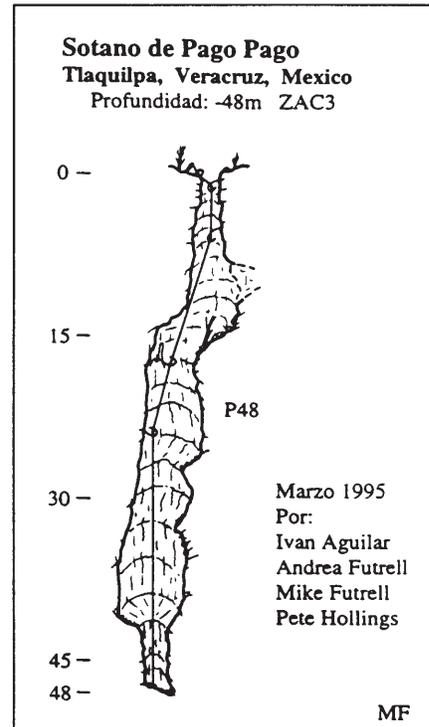
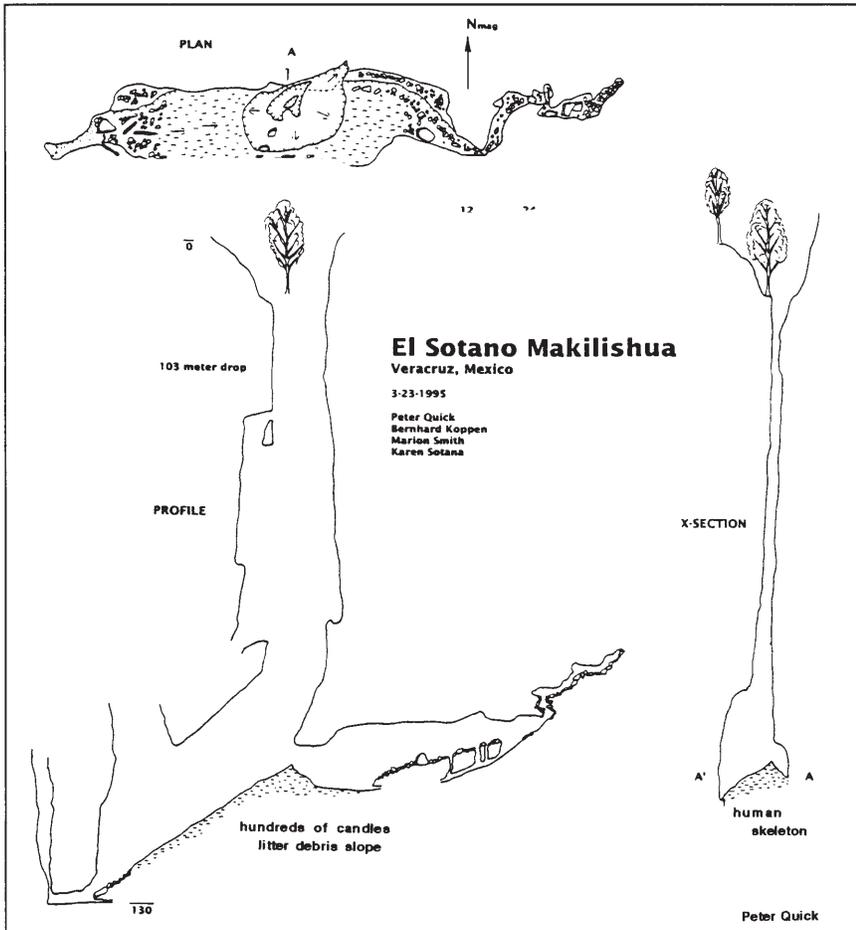
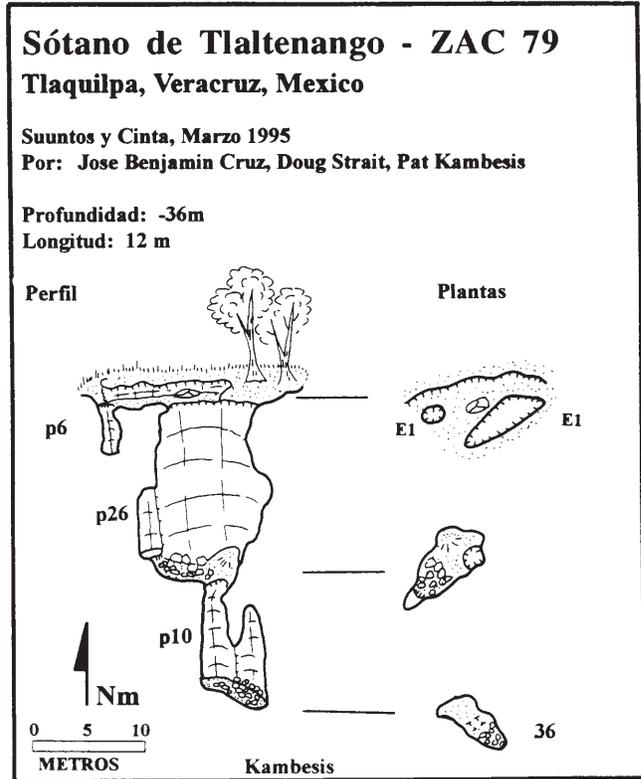
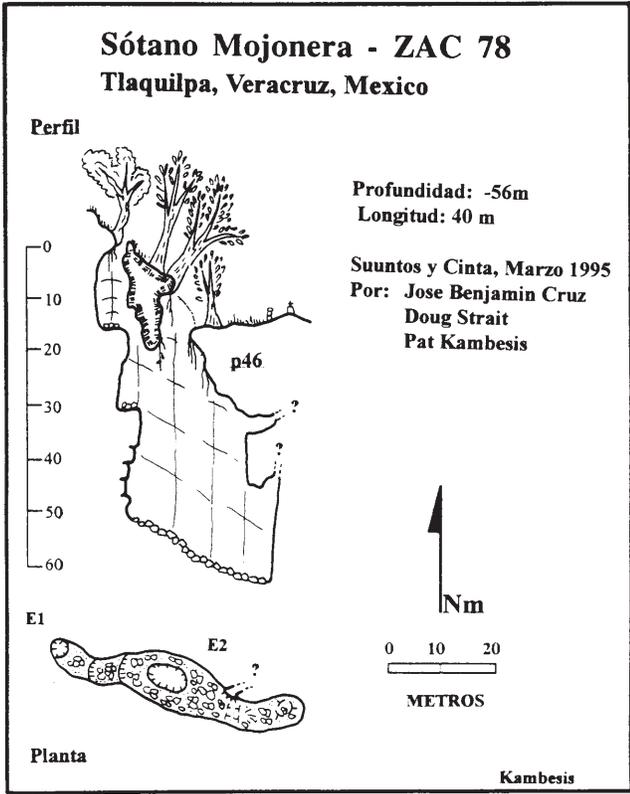
The rest of the expedition beat the bushes and hit the hills in pursuit of leads. Since three different crews chose to concentrate in the same area, they kept bumping into each other on and off during the day. The locals had a good time with that.

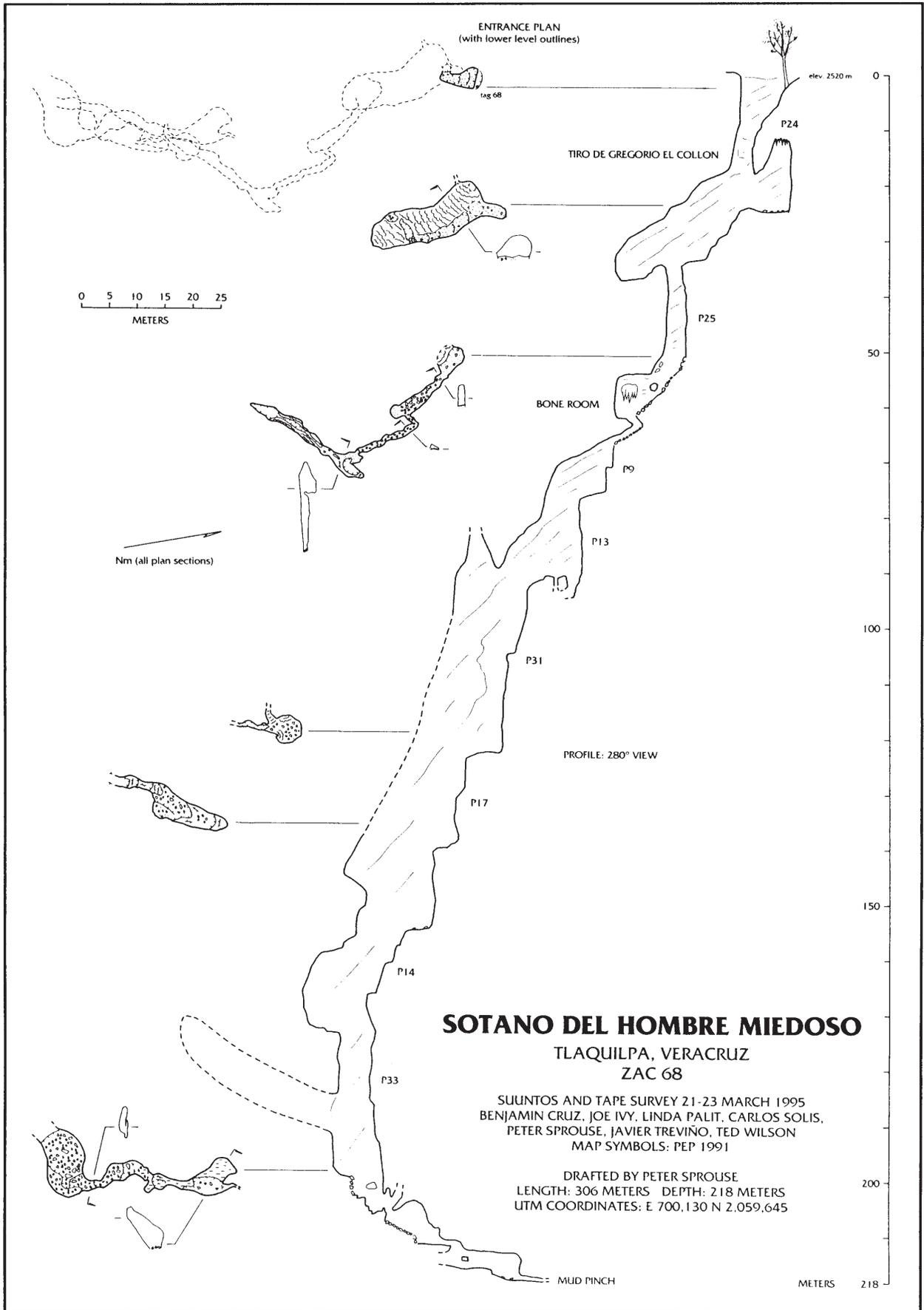
Peter Quick, Bernard Köppen, Shirley Sotona, and Karen Sotona dragged around lots of rope, bolts, and vertical gear to be rewarded with Bug Sucks Gnat Hole, an inauspicious 16-meter entrance drop to 20 meters of cave with a tight crawl at the end.

Ivan Aguilar led Mike and Andrea Futrell and Pete Hollings to a cave that he and the other Veracruz cavers had found the previous day. Sótano de Pago Pago is located about 1.5 kilometers east of camp and is a 50-meter-deep pit terminating in a mud plug. Sótano de Pago Pago translates to Paid and Paid Pit, in recognition of the entrepreneurial efforts of the local people. Since there was a bit of geographic overlap between the three ridgewalking crews, the locals took advantage of this by selling "lifetime" rights to the trails and the various pits to more than one of the groups. Repeated discoveries of the same pits, though frustrating to the cavers, certainly raised the financial standards of the area that afternoon.

Jim Smith, Teresa Williams, and Marion O. Smith followed one of the Veracruz cavers to a *sótano* that they had discovered several days earlier. Sótano de Tlaquilpa turned out to be a 94-meter pit. A short 6-meter drop from the entrance was rebelayed near the end of the first rope, allowing descent of a 91-meter pitch in the pit. At the bottom, the floor sloped 10 meters to a dead







end. Later, Mike Futrell descended a parallel 11-meter pitch that ended up, unexpectedly, not connecting to the main drop.

The best find of the day was Sótano del Hombre Miedoso, Scary Man Pit. The cave was situated about 1900 meters northeast of town at 2510 meters elevation, not far from the house of a local named Poncho. The cave was discovered by Carlos Altamirano, Charley Savvas, and Joe Ivy. The name reflected the Veracruz cavers' opinion of Charley's wild appearance, flamboyant climbing technique, and intense exploration fever. The entrance is a 24-meter sediment-lined sloping shaft followed by a steep handline slope to a second pitch. Scary Man was the first going, multi-drop cave of the expedition.

Just uphill from Scary Man and above Poncho's house, the cavers located Sótano de Poncho. The entrance pit is less than 2 meters across at the top and widens as it goes down. There is a 43-meter shaft that is broken by a ledge about halfway down. The talus slope at the bottom leads into a narrow rift and the top of yet another pitch. This one drops 8 meters into a meandering rift, which gradually becomes smaller until it is impassable at a depth of 73 meters. This pinch has air flow and could be enlarged. Sótano de Poncho is on the same trend as Scary Man, and it is possible that the two are related, with the possibility of a higher entrance to Scary Man.

Though nothing tremendous was found on this first day, the number of pits and some going cave put a

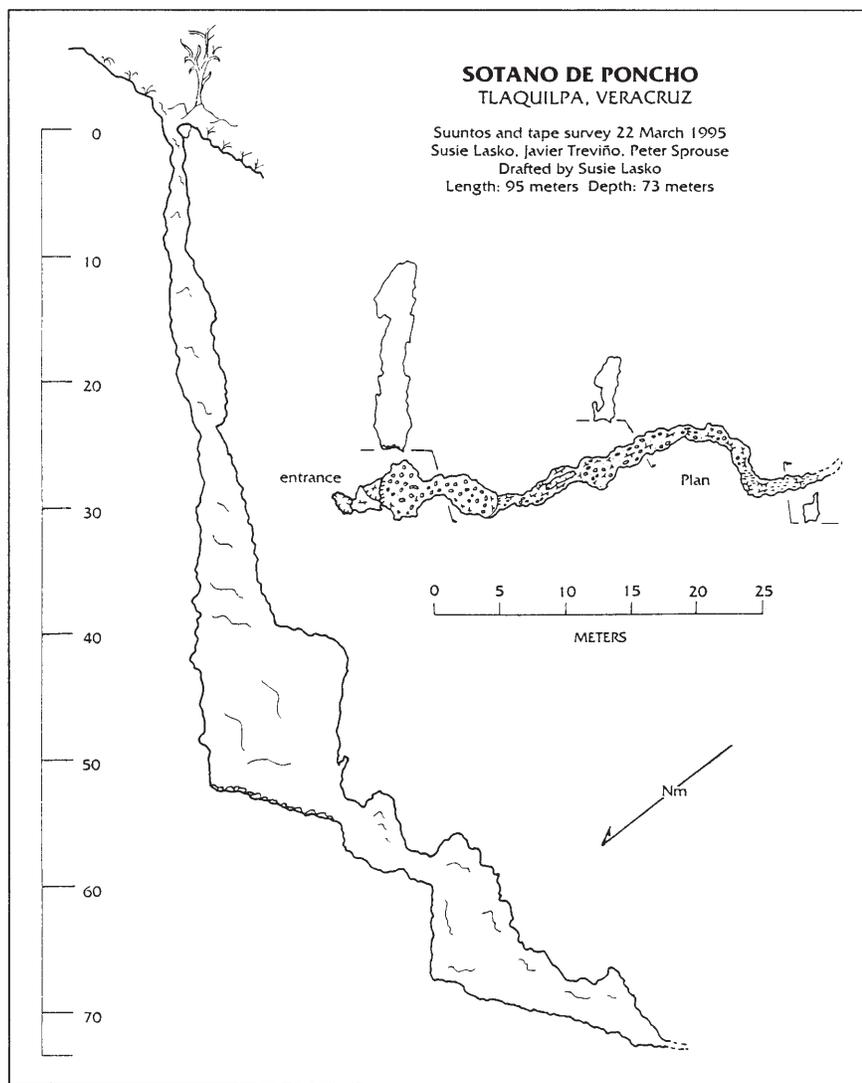
good spin on the expedition. The only troublesome factor was that there seemed to be some tension with the locals. Though we had letters of permission to be in the area, they charged us tolls to cross their land and to just look at leads on their property. They also argued among themselves about who was going to collect the tolls. Our underground forays fanned their preexisting distrust of outsiders. After all, it's common knowledge that the devil lives in the caves. And, as usual, there was the suspicion that perhaps the real reason we were there was to steal gold and artifacts from the caves. We laughed it off, for now.

The following day, while an enthusiastic survey team went to Scary Man to start mapping and continue exploring the cave, a second group caravanned to another interesting area between Tlaquilpa and Xococotla. Also, there was more ridgewalking to be done in and around the Tlaquilpa area.

Peter Quick, Bernard, and Karen hiked to a topo lead about 3 kilometers from camp, in the town of Tlaltenango. Cueva de la Basura could be seen while walking down the road. The cave is 45 meters long and is located at the base of a 10-meter cliff behind someone's house. The entrance slope was full of trash, and the adjacent corn field seemed to be eroding into the cave and filling it with sediment. Local Indians, curious at the gringo activities, asked if they saw the devil in the cave.

Peter, using one of the most tried-and-true ridgewalking methods, started asking everyone they met along the road if he knew of any *sótanos*. A man waiting for a bus pointed to some pine trees below which there was a pit quite visible from the road. ZAC 6 is located 100 meters east of the intersection of two roads to Tlaltenango. It proved to be a 6-meter-deep pit leading to a rubble slope and ending in breakdown.

One local did admit to knowing about a deep pit behind a house in town. As luck would have it, this particular house also sold *refrescos*



and *cervesa*, a good opening for asking about the pit. After a few beers, *refrescos*, and a little bit of convincing, Peter was able to talk the woman of the house into letting them explore the 10-by-20-meter hole in the back yard. Listening to dropped rocks suggested that perhaps the two ropes they had in their possession, totaling 90 meters in length, might not be enough. Bernard did the honors and confirmed that they were indeed too short. They planned to return the next day to finish pushing and mapping Sótano Makilishua, named by María, the local matriarch.

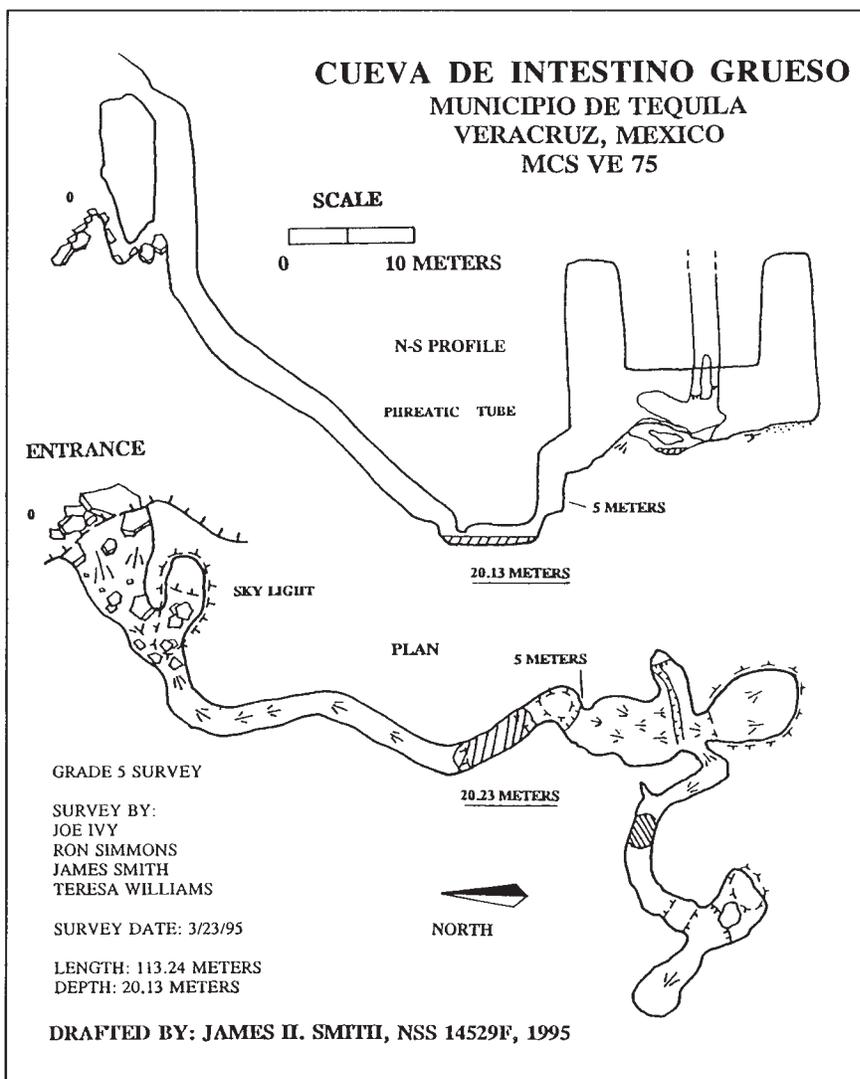
The next day, Peter returned with Bernard, Karen Sotona, Shirley Sotona, and Marion O. Smith. And this time they came prepared with much more rope. Bernard descended first, placing bolts for a rebelay, and the survey team followed. The first drop measured 103 meters. At the bottom of the pitch, the cave opened into a large, sloping chamber 20 meters wide by 40 meters long. The floor, a steep, 38-degree slope of mud and debris, was littered with hundreds of long, white church candles. Peter's suspicion was confirmed as he was making his way across the rubble slope below the entrance and found pieces of human skull and arm bones. The crew mapped 150 meters of passage at the bottom of the pit. At the top, the locals were waiting, curious about whether the cavers had found *diablos* or *dinero*.

In pursuit of another great-looking air-photo lead, two streams sinking at the head of a valley, Ted Wilson, Doug Strait, Jim Smith, Gary McDaniel, Benjamín Cruz, Marion O. Smith, and I crowded into a small caravan of trucks and drove toward the village of Xococotla. The plan was to locate the sinking streams and then work back down-valley, looking for pits and caves along the way. It was a beautiful day and a pleasant hike on the path between the cliff-lined edges of the valley. Several hundred meters from the parking area, a natural bridge spanned a narrowing of the valley. Water drained from the higher reaches of the cliffs

and flowed to the base of the bridge, sinking in what appeared to be enterable cave. As the hike progressed, more small entrances were observed on the cliffs that lined the valley. Finally, at the head of the valley, the two sinking streams were located. One flowed into a 10-meter-wide by 6-meter-high cave entrance. The second flowed into a low insurgence that would need some digging. The insurgences appeared to be on a geologic contact, perhaps between the Maltrata and Orizaba formations.

A leisurely hike back toward the vehicles, revealed even more entrances. Jim Smith and I were both eying the same line of cliffs and simultaneously noticed what appeared to be another one. Smith blurted out, "I'm not waiting for tomorrow; I'm scooping it today,"

and took off at a run across the valley, hooting and laughing all the way. I chased after him, and it turned into a race to see who could get to the cave and scoop it first. Jim won and stood at the entrance taunting everyone about the big, going borehole they were missing. I've done enough caving with Jim Smith to recognize a suck-in when I hear one. Instead, I checked along the cliffs for other entrances and noticed that some small trees and bushes were suspiciously blowing in a breeze. I called to Jim, "If it blows, it goes," and disappeared into the small, sloping entrance. Smith, in scooping form, was on my heels and slid past me down a slick mud slope toward a deep pool of water. I expected to hear a splash, but instead found Jim waiting at the edge. "Thought you might want



to give it a go," he said with a smirk. The passage narrowed and a waterway opened in front of me. "This is wetsuit stuff," I replied. "Looks like we're coming back here tomorrow," he said.

Back at the vehicle, the local *jefe* was waiting. We showed him our letters of permission, and the *jefe* dismissed them as invalid: They were for Tlaquilpa, and this was Atlahuilco. Benjamín tried to smooth things over. The *jefe* would let us come back, he reported, if we agreed to donate some money toward buying a new soccer ball for the village. That seemed reasonable, and we paid and made plans to meet the *jefe* the next day.

At camp, over dinner and music, everyone shared caving adventures. The Scary Man crew was the only one still underground. The Veracruz cavers were concerned that their party members had not yet returned, especially because they were caving with Charley, whom they still considered the scariest of men in a cave. When the group finally returned, they reported going down the 25-meter second pitch and landing on a rocky slope that led into a room. The cavers pushed a sloping crawl that had to be dug open and followed it to a 9-meter drop. This is immediately followed by a 13-meter pitch and a bit of horizontal passage over a rift in the floor. This floor disappears at the next pitch, 31 meters deep. The crew then encountered in quick succession three more drops of 17, 14, and 33 meters. At the bottom of the last pitch it is possible to go both up and down stream. The upstream direction was explored for about 35 meters. The downstream route goes down several climbs to a pinch in an area of sumpy-looking mud. Though the cave was nearly pushed out, it did require more survey work and final lead-checking.

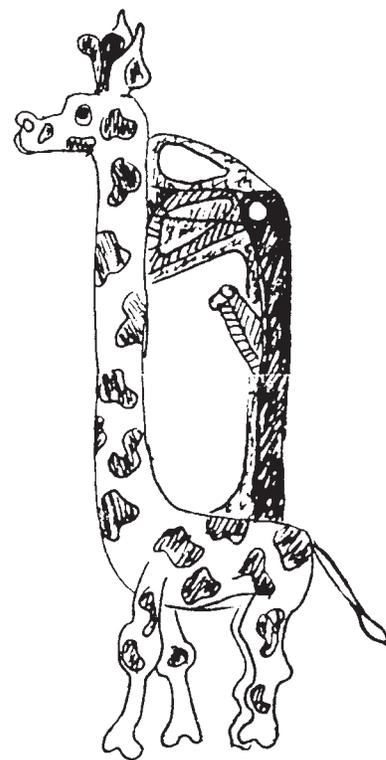
The next morning, as we prepared to leave camp, I was confronted by a rather irate and drunk local who got in my face and just yelled at me. The fact that I could understand him perfectly was a bit disconcerting, since the only words

I can generally understand and say in Spanish are cuss words. Rather than practice my limited vocabulary on him and make matters worse, I just glared at him until he walked away. It was definitely time to go caving.

With caves left to explore and map, a big group returned to the karst valley near Xococotla. Jim Smith led a team of Teresa Williams, Joe Ivy, and Ron Simmons to push the wet cave we had discovered yesterday. Doug Strait, Linda Palit, Javier Trevino, Gary McDaniel, and I, plus the Veracruz cavers, hiked up the valley to begin mapping the insurgence cave and other openings. The *jefe* and an entourage of village elders led the way to keep an eye on us.

Cueva Mojonera was the first obvious entrance on the cliff-line to the east. The entrance chamber had pot shards and other evidence of human use and was overgrown with some sort of stinging nettle the locals call *chicasacle*. At the far end of the entrance chamber was a small blowing hole that Gary and Javier worked on enlarging. The rest of us commenced mapping, and Doug, being our only Spanish-speaker, talked to the village elders. One of the older men gestured at Gary and waved his arms about wildly, while the rest of the men broke out in wild laughter. They were obviously having a good time at our expense. Doug translated that they were noting that Gary would make good breeding stock if the Nahuatl population decided it needed to become taller. They wondered if we'd be willing to sell him, which is what caused the hilarity. At that point, oblivious of his genetic potential to the Nahuatls, Gary disappeared into the constriction, and we all followed, leaving the Indian guys to make more jokes about strange Americans.

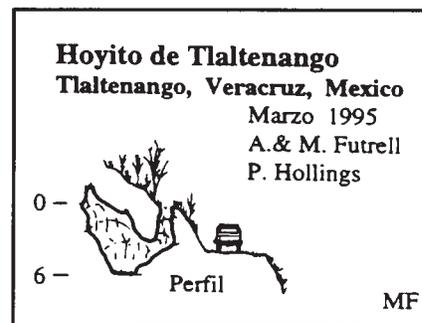
Beyond the constriction, the passage continued as a low crawl that overlooked a short, free-climbable pit. Doug did the honors and reported that it was blind. Javier climbed into a dome beyond the constriction, and I explored over the pit and into another dome. The



Rare and much coveted Veracruz Golden Giraffe. Drawing by Teresa Williams.

passage became narrow, and the only remaining lead was an upper-level, ascending passage that we had no means to reach. We left the cave, and our hosts bid us goodbye. They were bored by our antics and sauntered back home.

Our next objective was the insurgence cave at the head of the valley. Resumidero de Xococotla measured 40 meters in length, with a vertical extent of 10 meters. A good stream of water flowed into the entrance, over breakdown, logs, and other organic debris. The water funneled into a low, tight crawl that would need digging to push.





We wanted to check out the other insurgence, but the locals insisted that permission from another municipio was needed there.

Jim Smith: Ron, Joe, Teresa, and I returned to Cueva de Intestino Grueso to continue the exploration. The low air-space that had thwarted forward progress the previous day was only 3 meters long, and we emerged into a steeply ascending, muddy tube. We were stopped shortly by a 4-meter climb. Ron was the hero and climbed up the slippery wall. We threw him a rope, and he anchored it to his body for us to climb. We found a 15-meter dome and a passage with all the air. The tube only ran about 40 meters before we encountered another 15-meter dome and the end of our exploration. The air was coming from the dome. We never climbed the hillside to look for other shafts that might connect to the dome. It had been a 2.5-hour trip. On the way back to the truck, we entered another cave, Cueva de Xococotla, which we did not survey. It had a trail-side entrance and started out as an exciting

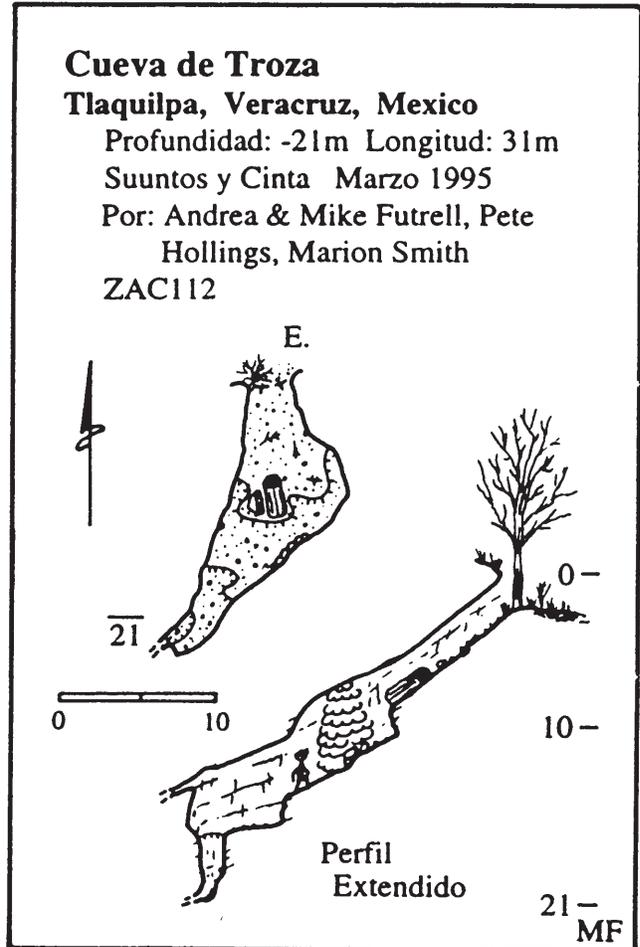
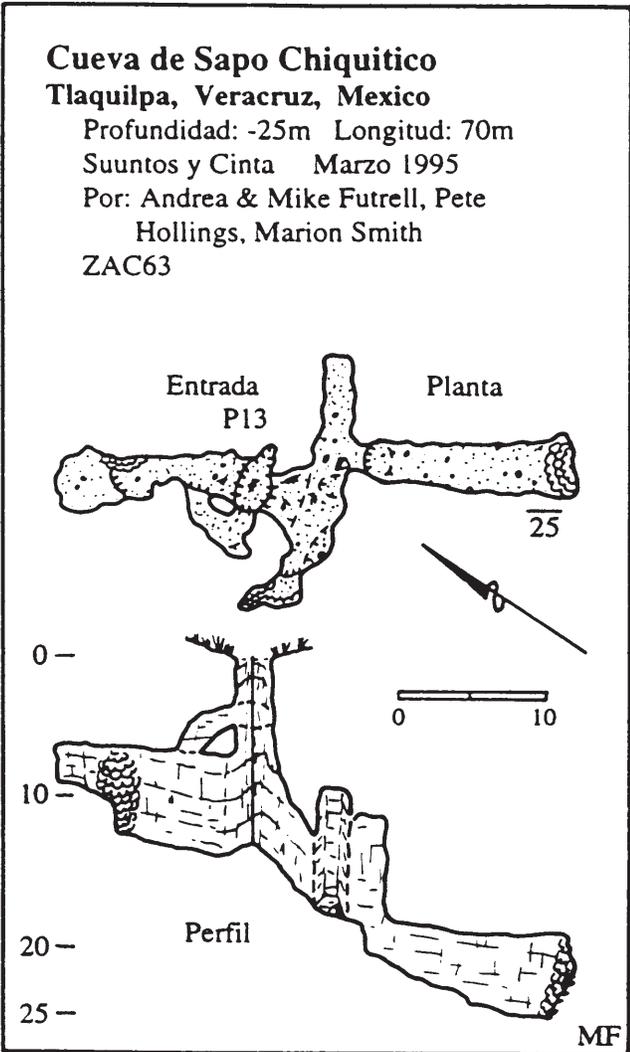
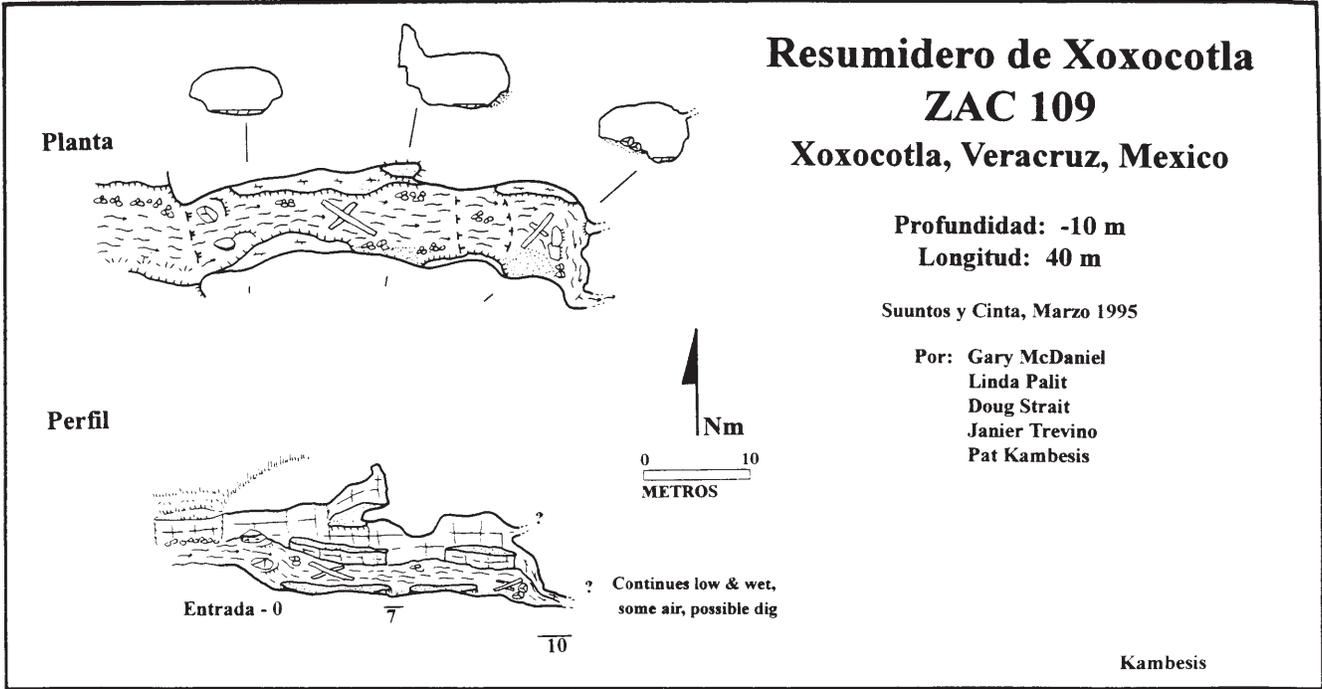
prospect. The opening was 8 meters wide and 4 meters high and drained an arroyo. The cave was explored for 150 meters to sand crawls. There was no air flow. We estimated the depth at 20 meters.

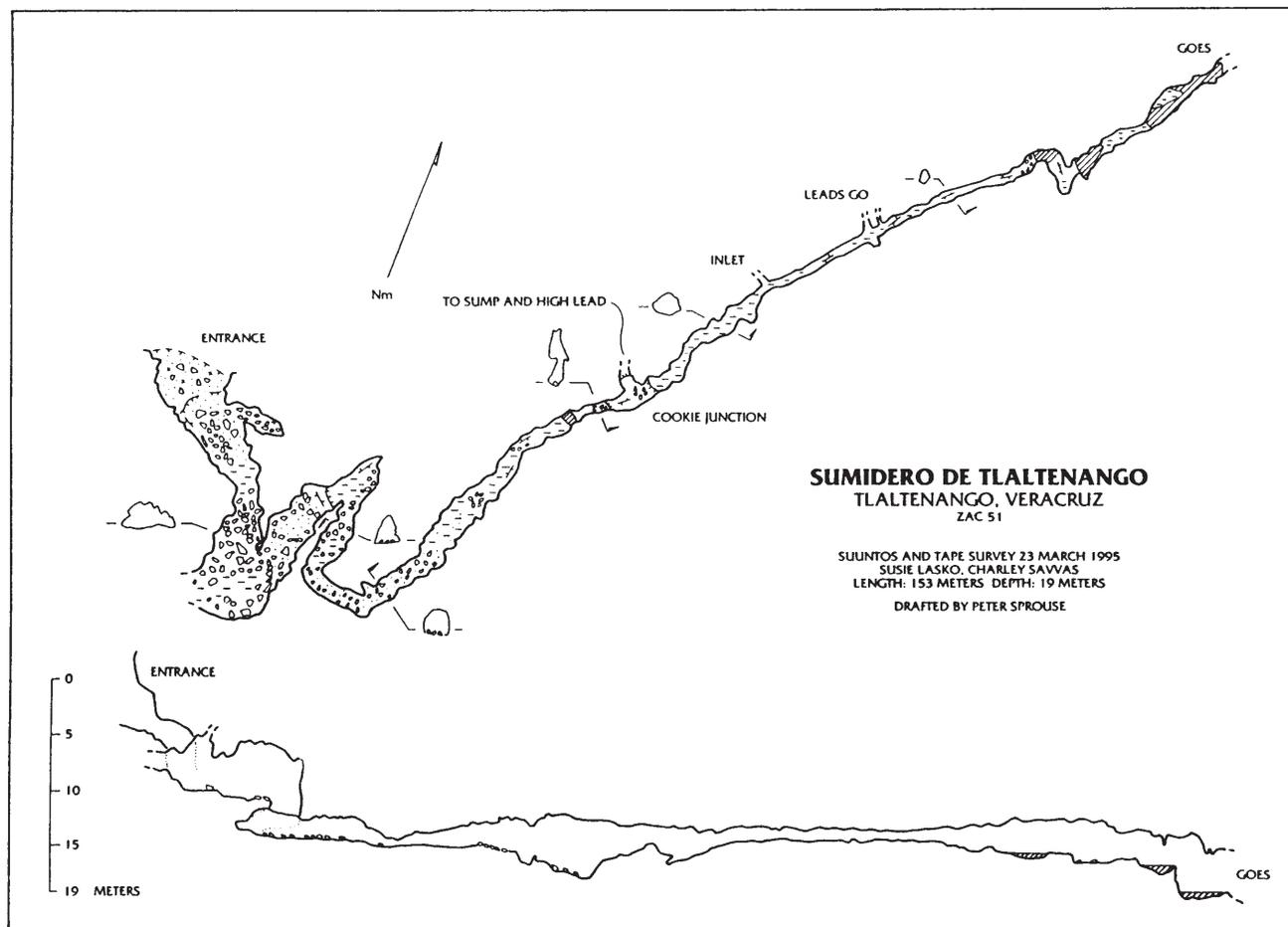
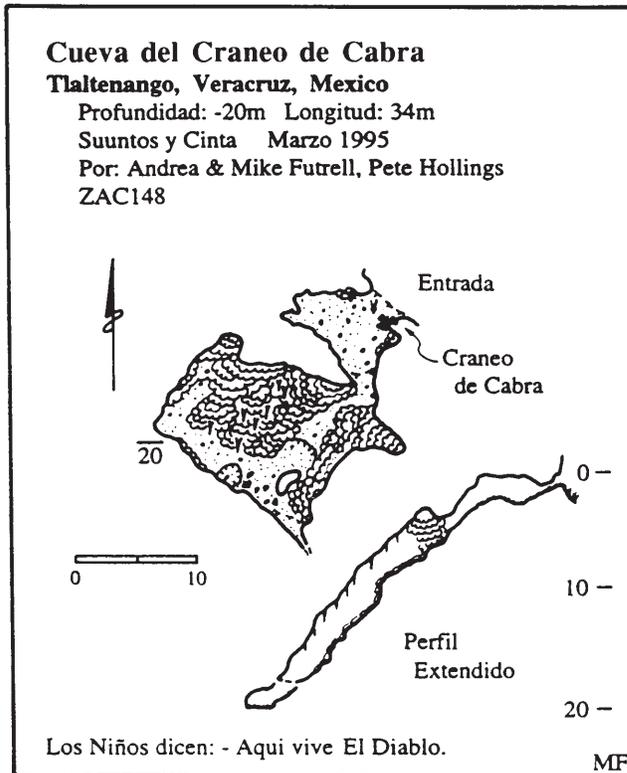
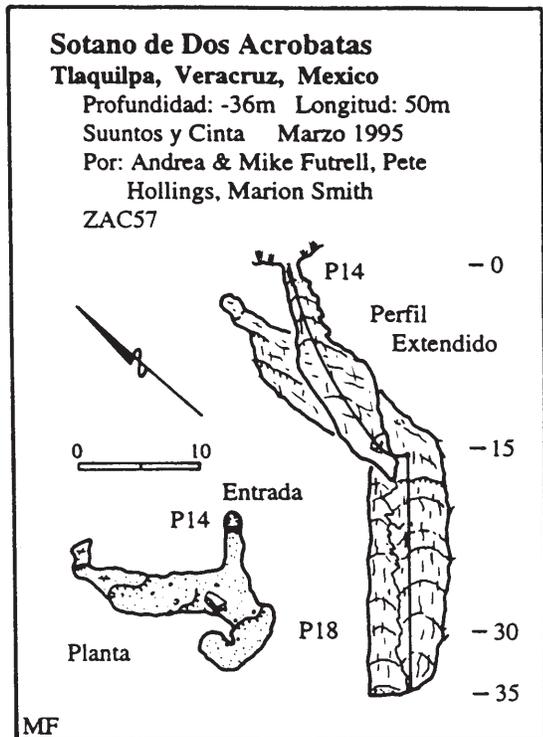
The Veracruz contingent, who had taken off to do some ridge-walking on their own, reported that they had discovered a deep pit up near the top of the cliffs. Unfortunately, we didn't have enough daylight left to check it out. So we hiked back to the vehicles to wait for the others. But they were waiting for us. The jefe had left word that we owed them more money for using their trails, and if we wanted to come back, we'd have to pay up. We quickly piled into the vehicles and headed back toward camp. About a quarter-mile from the junction to Tlaquilpa, we came to a dead stop. An abandoned vehicle, left up on jacks, was sitting in the middle of the road, blocking all traffic. Joe Ivy was able to squeeze his vehicle between it and the sheer cliff on the

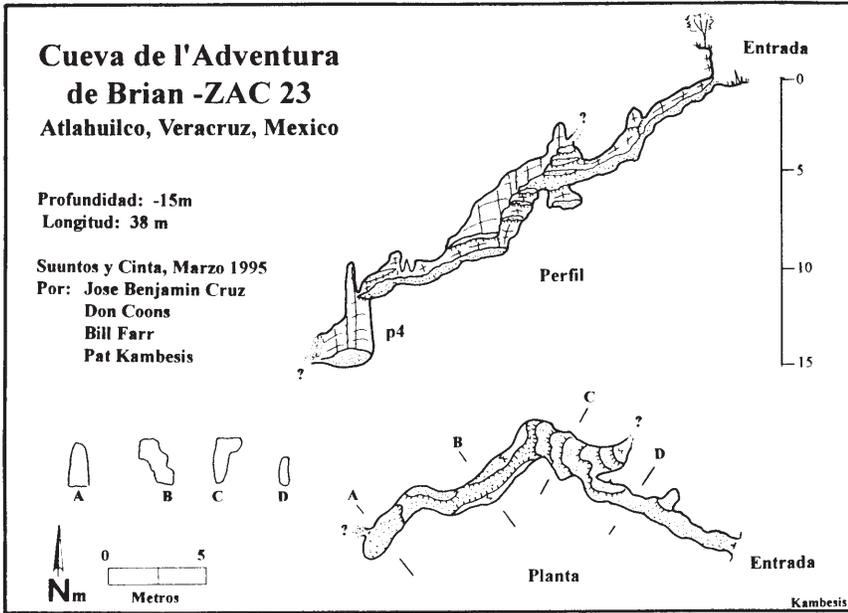
Benjamín Cruz at Sótano de Mojonera. Pat Kambesis.

edge of the road. Smith's truck was too wide to pass. We all jumped out and opted to make the hike back to camp, 5 or 6 kilometers away. Jim prepared to spend the night in his truck.

While we had our adventures in Xococotla, others continued to chase leads in the Tlaquilpa area. Mike and Andrea Futrell, Pete Hollings, and Marion O. Smith accompanied Carlos Altamirano to three more pits that the Veracruz group had found earlier in the week. Though nothing outstanding, these would certainly qualify as caves back home. Cueva de Troza is a small cave that consists of 20 meters of steeply sloping passage. Sótano de Dos Acróbatas is a small hole in the hillside that drops into a sloping chamber and ends in an 18-meter blind pit. And, finally, Cueva del Sapo Chiquitico consists





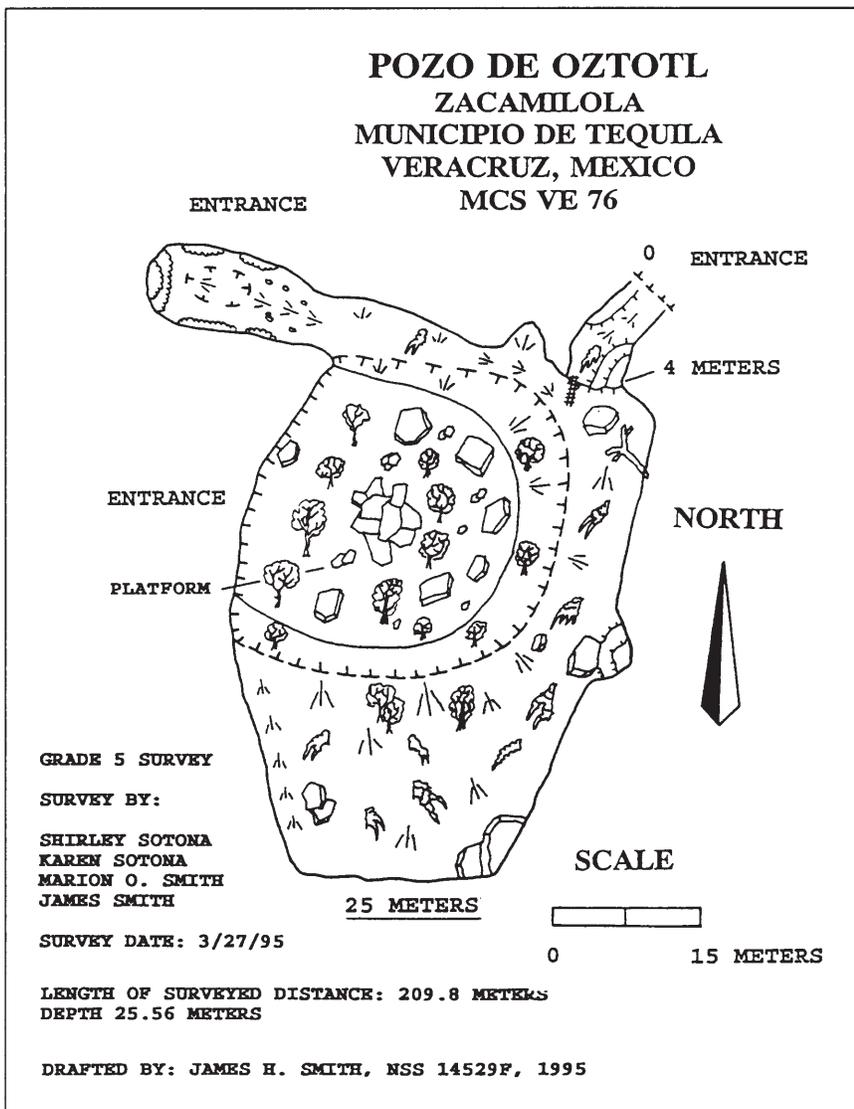


of a large entrance hole that drops 10 meters to a talus slope and 20 meters of cave.

Two local guys led Mike, Andrea, and Pete to a small pit near the side of the road. The 3-meter drop with 3 meters of slope was named Hoyito de Tlaltenango, but we also called it Pud Pot. Some children led them to a small cave west of Tlaltenango. The entrance is a low crawl over glass that opens into a small room. Pete explored the cave, while Mike and Andrea did the survey. Mike noted that the entrance room contained a goat skull, and that became the name of the cave, Cueva del Cráneo de Cabra. When they left the cave, the children asked in chorus, "¿Aqui vive El Diablo?" and they laughed when the cavers told them, "No."

Susie Lasko and Charley Savvas had the best luck. On their hike north of Tlaquilpa, at 2330 meters elevation, they discovered a major drainage route that takes floodwater coming off the impermeable rocks to the west. The entrance to Sumidero de Tlaltenango is horizontal and takes off into the south wall of the valley, sloping down to a T intersection. The passage to the right was not explored. The left passage continues walking or stooping height. A number of leads come into this passage from the left. At the limit of exploration, 153 meters in, the cave continues larger, wetter, and with air flow. This was certainly the best lead of the expedition.

At last, after four days of ridge-walking, things were starting to look up. Although we had been spending a lot of time dropping blind pits and mapping small caves, this was to be expected at the beginning of an expedition to a new area. What we didn't expect was the local politics. Apparently, though we had permission and had paid for two weeks, in advance, to camp on the land at the outskirts of town, our presence was adding to some sort of feud between the hill farmers and the villagers. That, coupled with a general mistrust of gringos, gave credence to a story told by a child who claimed he had seen us remove a golden giraffe

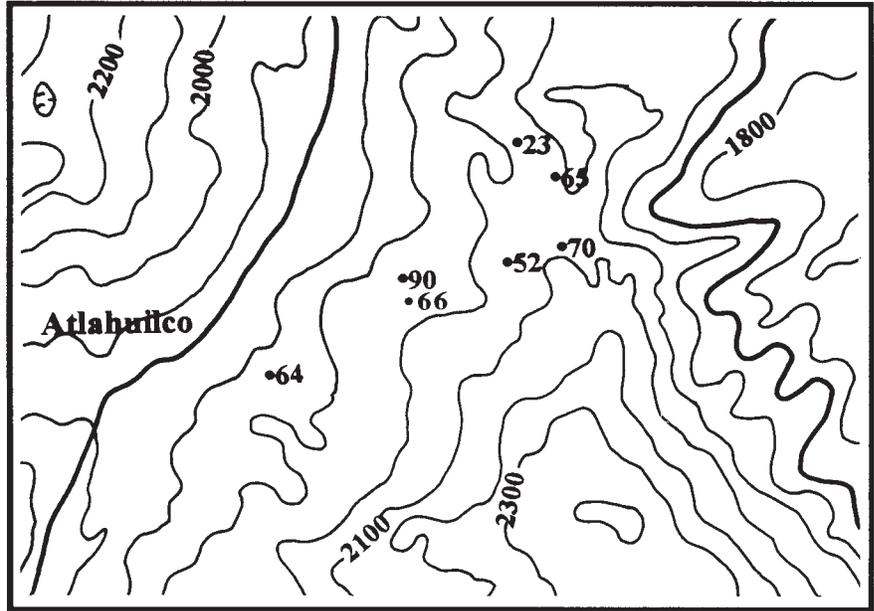


from a cave—a yellow, Jumar-shaped giraffe, to be specific. By late afternoon, the situation had escalated to the point where we were being accused of looting the caves of gold and communing with the devil. Peter Sprouse was informed that we had to pack up camp and leave immediately. They did agree to let us have one more night at camp and to allow a team into Scary Man so that we could collect our gear. With a small derigging team, Peter took off for Scary Man, and Susie and Pete Hollings spread the word around camp that we needed to be ready to leave in the morning.

That evening the locals came out in force to visit our camp. They were reserved and polite and were hoping to make a killing selling hand-woven goods to the cavers. They did indeed have some beautiful pieces to sell, including wool *sarapes*, blankets, shawls, and purses. We were surrounded by small groups of hawkers who got into bidding wars with each other. We stayed up quite late, but though the Scary Man crew had not yet returned, we were not concerned. They were probably trying to finish off mapping and exploring the cave.

However, we did begin to worry the next morning, when they still were not back. Charley hiked to the entrance and discovered that the rope had been cut. Fortunately, nobody was on rope when it happened. They had been huddled at the bottom of the entrance all night, waiting for someone to discover their plight.

When Peter surfaced, he was justifiably angry and took off for Atlahuilco to file charges against the local sub-*jefe*, the prime suspect. He was informed that it would take several days for them to even find the guy and that there was no guarantee that charges would stick. Despite the discouraging response, Peter was able to make arrangements for us to set up another camp in Atlahuilco. The people there were very friendly and accommodating and had no problem with our checking the cave potential of

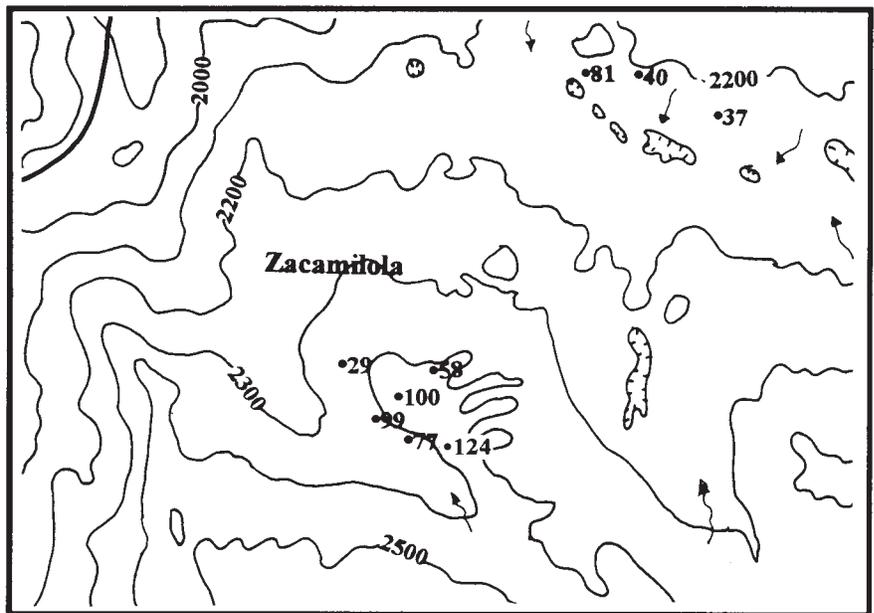


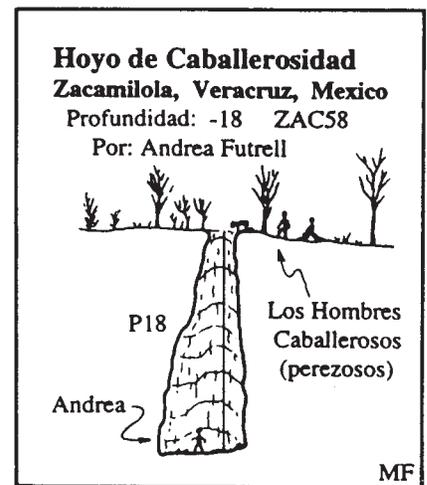
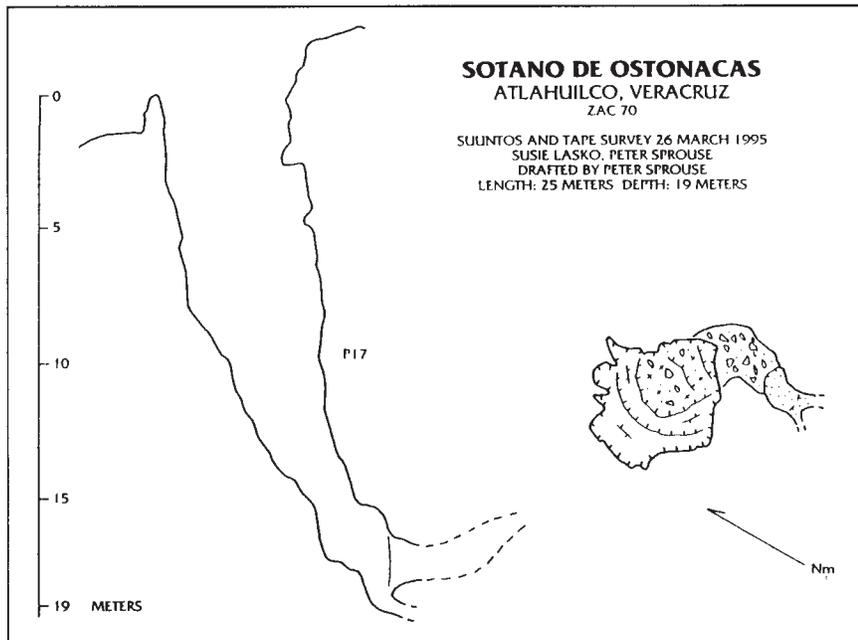
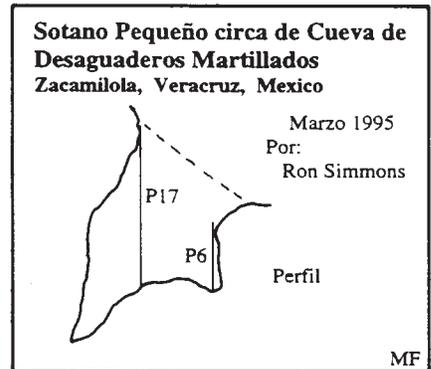
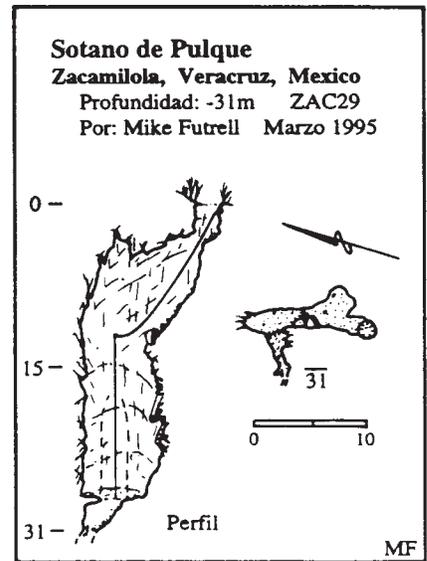
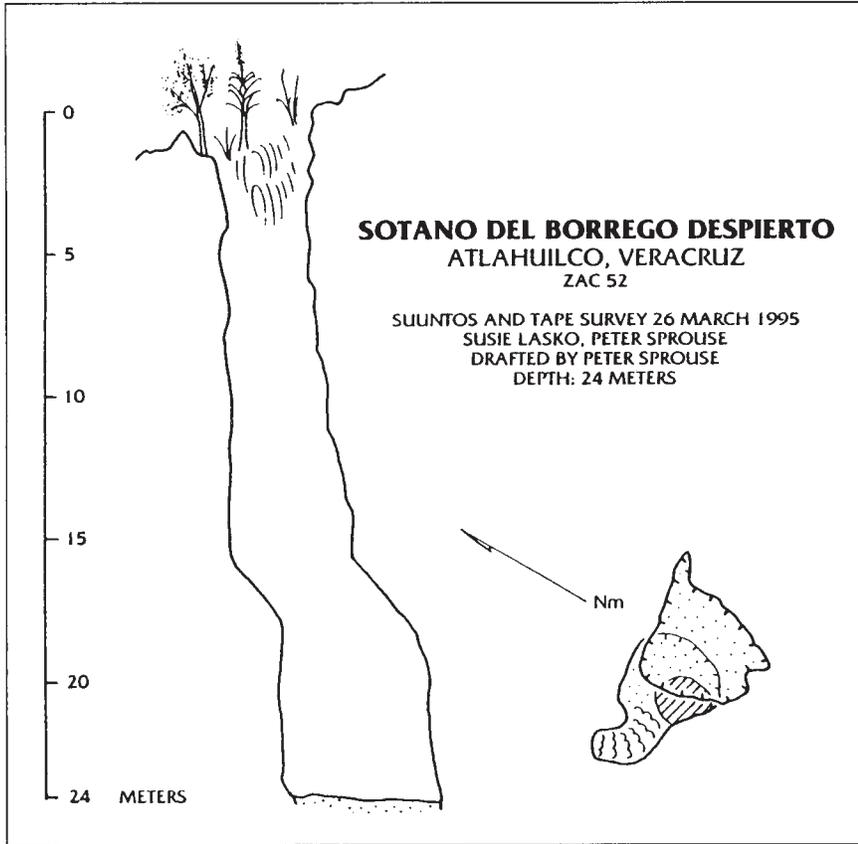
Atlahuilco area: 23. Cueva de l'Adventura de Brian. 52. Sótano del Borrego Despierto. 64. Cueva de Xometla. 65. Grieta de Venados Muerte. 66. Sótano de Cuauhtlaquichapa. 70. Sótano de Ostonacas. 90. Cueva del Dolor de Cabeza.

their area. The only problem was that a Belgian expedition had partially explored the area several years before. Luckily, we had a copy of their expedition report and could tell which caves they had explored and mapped.

It occurred to me that Jim Smith, who was still parked behind the abandoned truck, had no clue that we had to move to Atlahuilco. Shirley and I hiked in to give him directions and some water, then we drove down to Atlahuilco to make

Zacamitola area: 29. Sótano de Pulque. 37. Hoya de Chicas. 40. Sótano de Nova. 58. Hoyo de Caballerosidad. 77. unnamed small cave. 81. Sótano de Frijole. 99. unnamed pit. 100. Cueva de Desagüaderos Martillados. 124. unnamed pit.





camp. On the way, we passed Joe Ivy, Linda Palit, Gary McDaniel, and Javier Trevino, who were on their way back to Texas. To take their place, Bill Farr, Carol Vesely, and four-month-old Brian Farr had arrived. Shirley, Karen, and I drove to town and picked up Don Coons and his daughter Tracey.

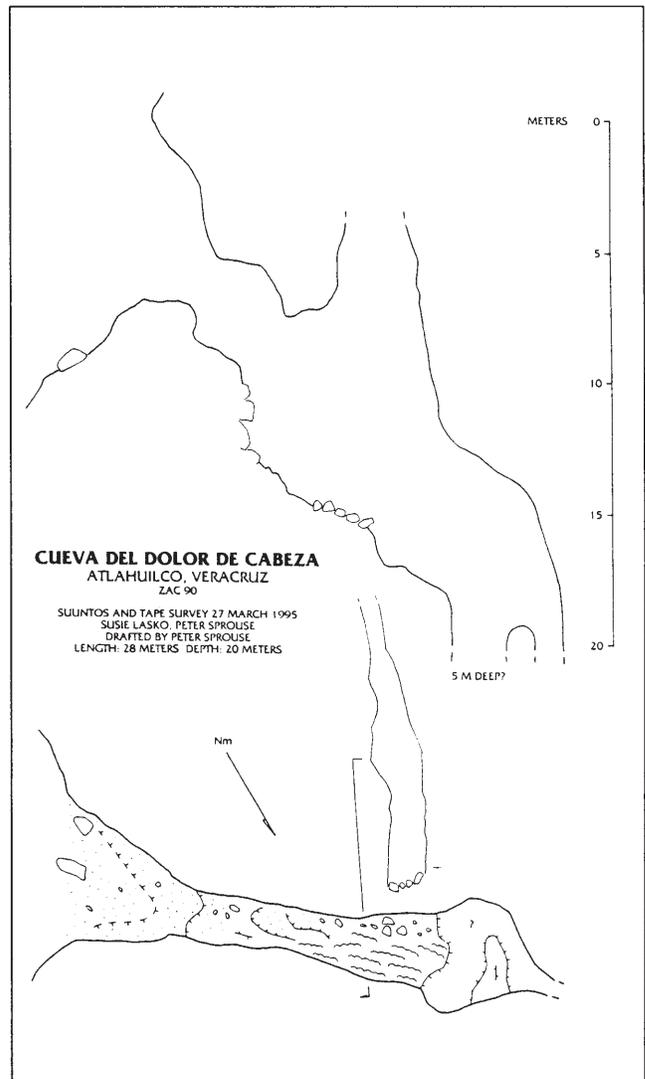
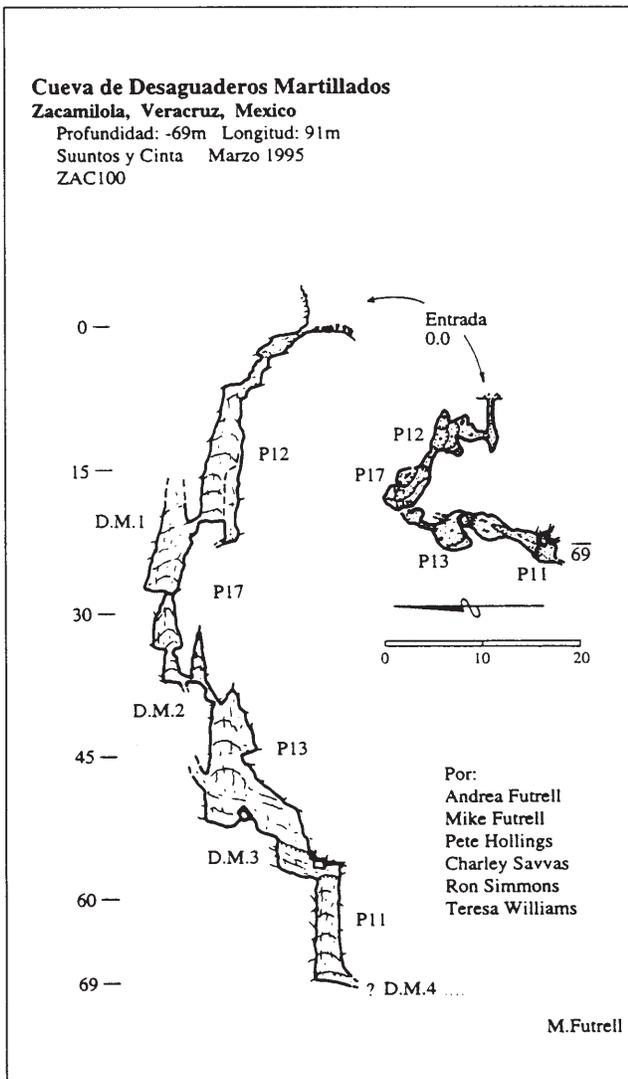
Instead of the cool shade of the pines and the high mountain air, our new camp was in a flat, treeless field behind a school. But we were within walking distance of town, with its *refrescos* and *cervezas*, and within minutes of a number of trails that would take us up into the mountains behind camp. Over the next four days, we again split up into small teams and headed for the hills in search of anything that resembled a *cueva* or *sótano*.

Peter Quick, Bernard, Shirley,

Teresa, Charley, and Carlos Altamirano paid a guide twenty pesos to take them to any pits he might know. He took them to a cave known as Cueva de los Cazadores, a 20-meter-long cave notable because of its Romeo-and-Juliet history. Two young lovers had died in the cave, either by committing suicide or being shot. It was unclear which. There were two crosses at the entrance, bearing the names and dates of the deceased.

The next pit they explored had a 53-meter entrance pitch. At the bottom was a tall room 20 meters long. Off one side of the room was a tight crawl that led to a small chamber and another drop. Charley had to hammer his way through the tight spot to get to the drop, 17 meters to a final room. It was named simply ZAC 48.

Peter Sprouse, Susie Lasko, and Carlos Solis explored Cueva de Xometla. The cave is 800 meters east of Atlahuilco, at an elevation of 1800 meters. It is located in a sink that takes considerable water from a ridge to the east. The entrance is a descending rift under a headwall. It slopes downward for 15 meters to open into the top of a spacious chamber. Two passages leave this room, at upper and lower levels. The upper passage is a steep climb to a dome-room. There is organic debris present, and there are high rifts off the dome that were not mapped. The downstream passage continues as a canyon that soon enlarges to walking passage developed along a prominent dip. The ceiling is solid rock, while the walls are dissolved out of a weaker unit. A climb down leads into a

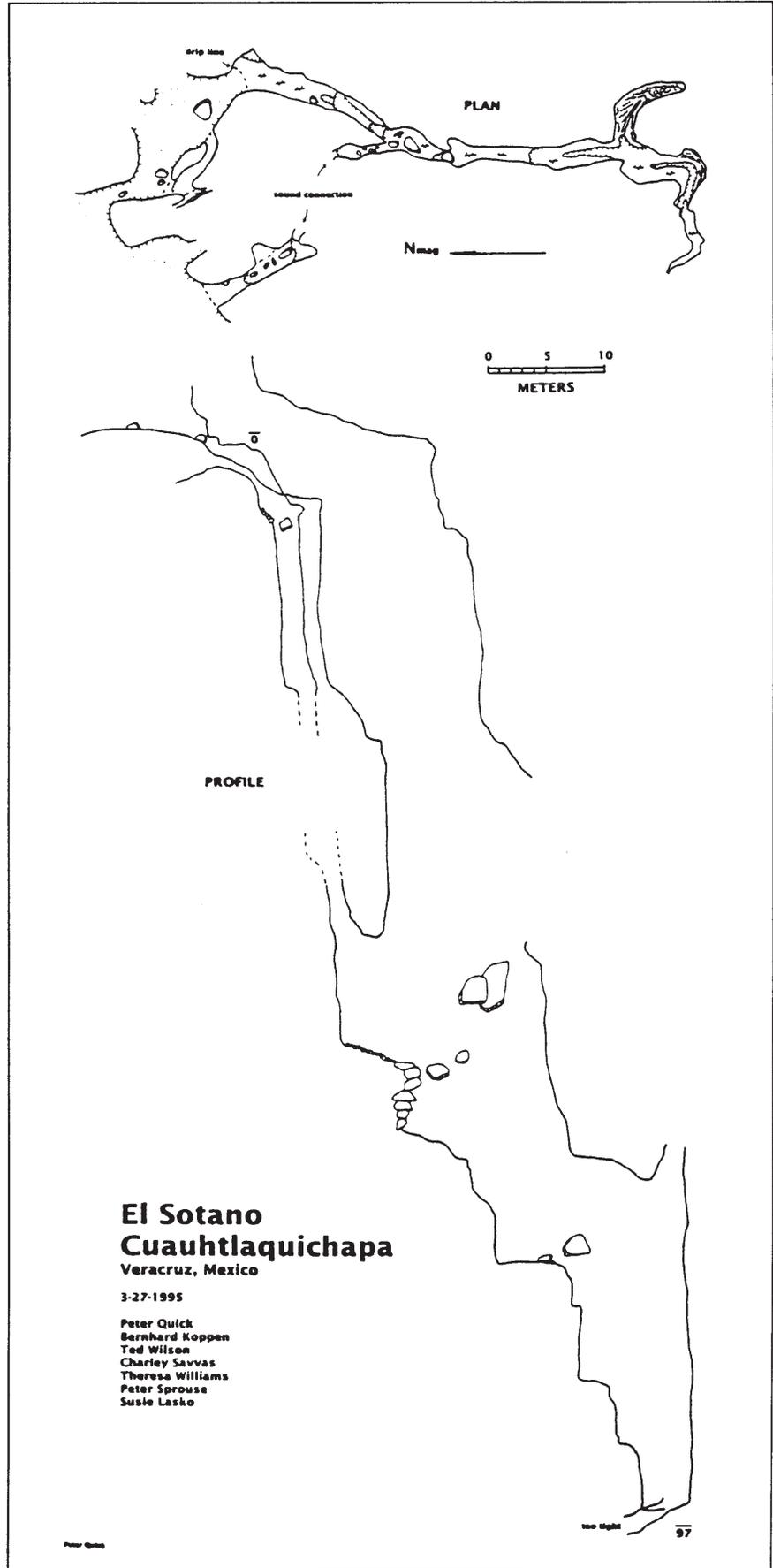


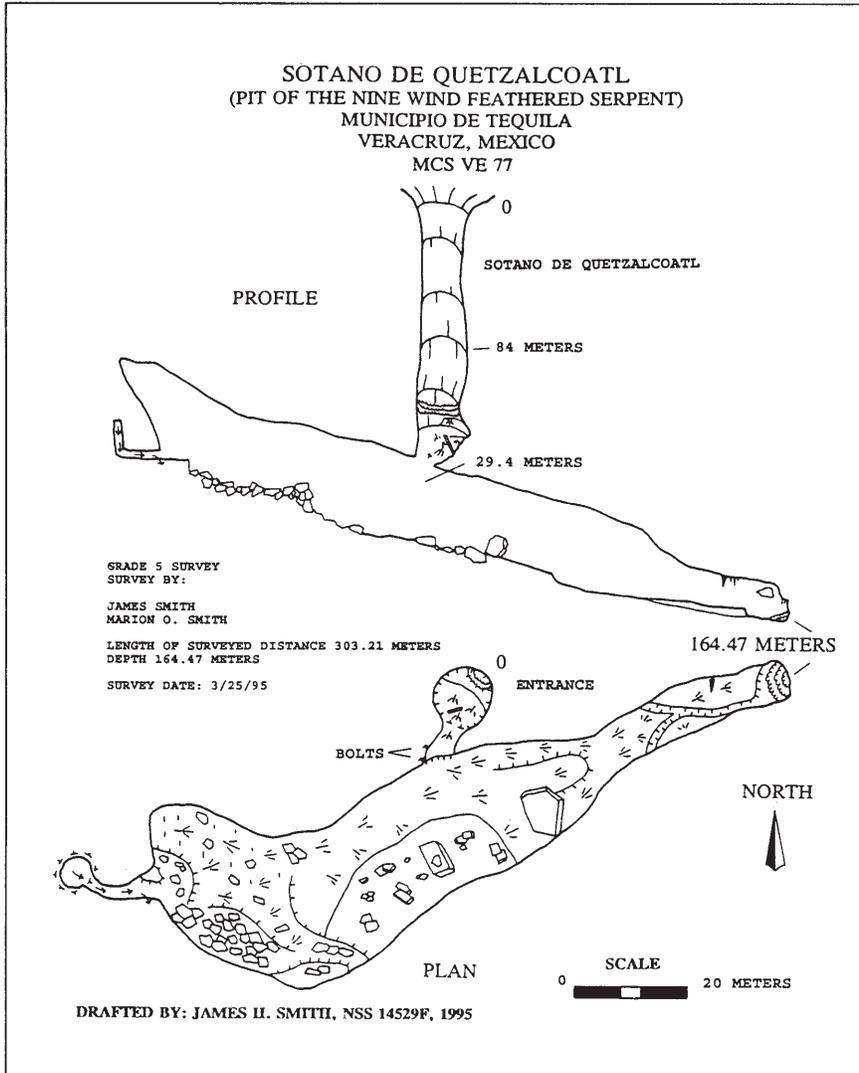
round chamber where the cave appears to end. A small hole in the floor goes through breakdown to a continuation of the dip, but this soon fills with sediment and becomes too small.

Don, Bill, Benjamín, Tracey, Carol (with baby Brian), and I hiked into the hills and just started asking anyone we saw if they know of *cuevas* or *sótanos*. Most people just ignored us. However, we did manage to stumble onto a small, obscure entrance in the side of a limestone bluff. The cave was drafting a bit of air, and with a little concerted squeezing Bill managed to stuff himself into the entrance. Don, Benjamín, and I followed eventually, finding ourselves in a walking canyon passage. This led to a series of climbs down, more walking passage, and then to a terminal dome room at the base of a 4-meter pit. There is a peculiar lead at the bottom of this pit. The far wall of the pit is not made of bedrock, but rather sediment, with a small crawl at the bottom. It looked pretty treacherous, and Benjamín found out that pushing it would bring down the wall. We named this discovery Cueva de l'Adventura de Brian.

A little more aimless hiking took us to a fissure-type cave entrance with a 24-meter pitch. Don, Benjamín, and I descended the pit and explored a second drop, a narrow canyon 25 meters deep. A series of small climbs down ended in a dome room with two low crawls at the bottom and an upper-level lead off the top, all unpushed. The deer bones at the entrance inspired the name Grieta de Venados Muertos.

Jim Smith: On March 25, Marion, Ted, Christian, Benjamín, Ivan, and I were led by three locals to check a cave and a feature on an aerial photo; perhaps the cave and the feature would be the same thing. The cave was located 400 vertical meters above the vehicles, near the top of a large kegelkarst hill. Fortunately for us, a trail passed within 60 meters of the cave. A guide said that his father had seen a feathered serpent fly from the entrance when he was a boy. This gave us the idea for a name, Sótano de Queztlacoatl or pit of the nine-winged feathered serpent of



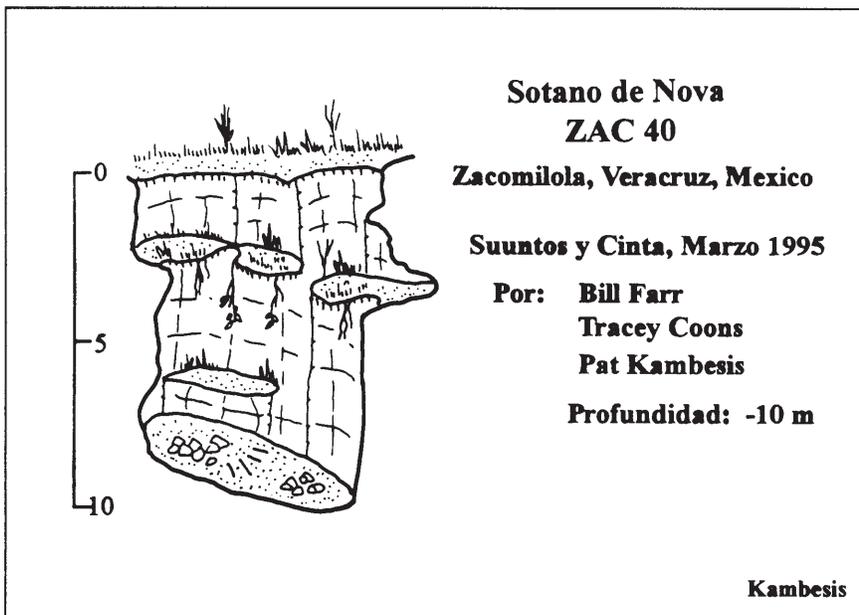


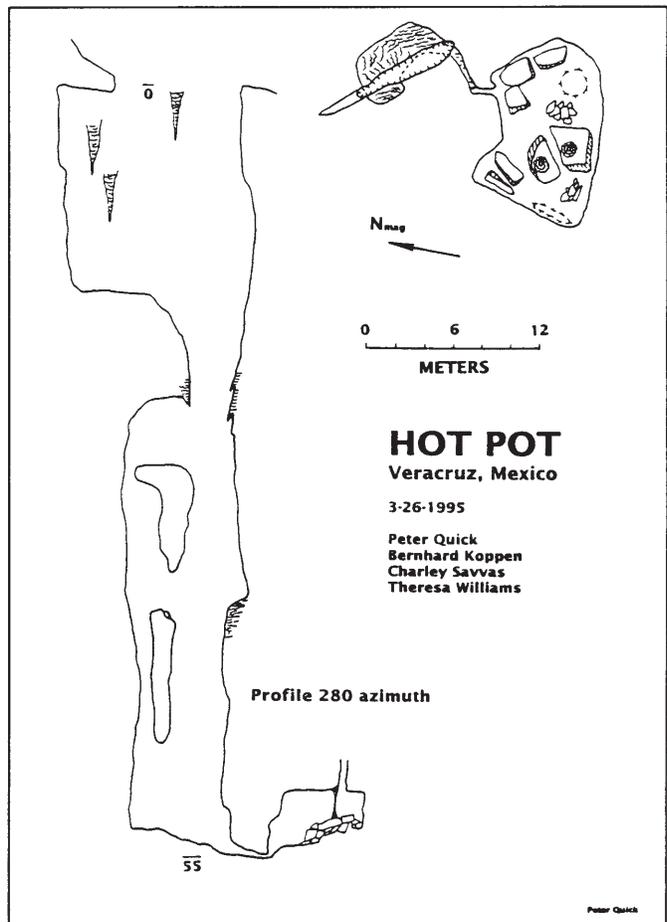
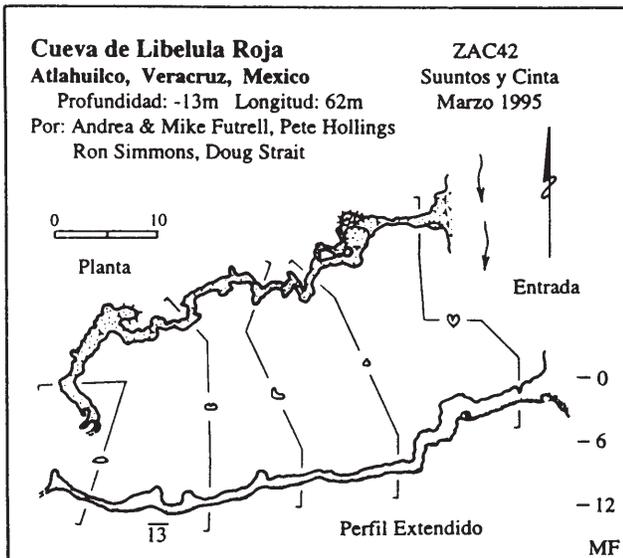
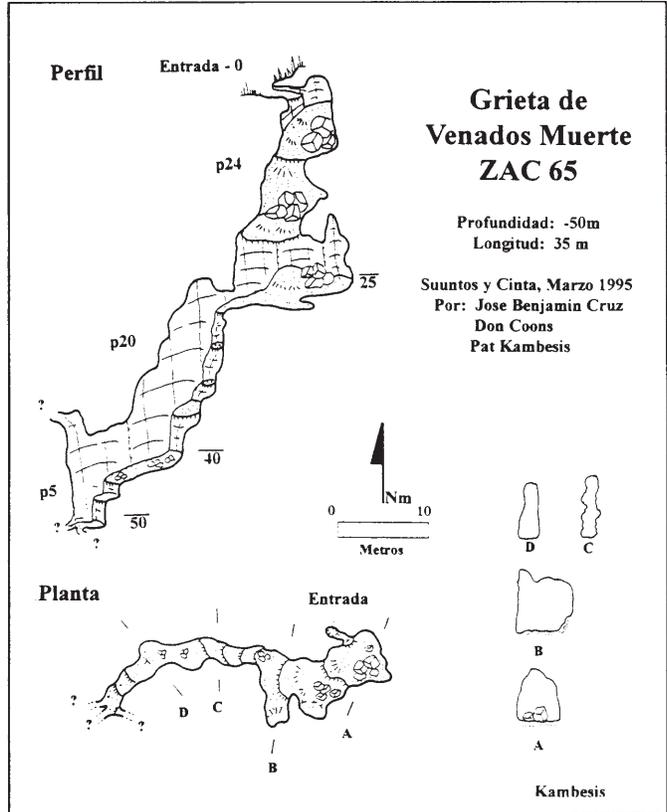
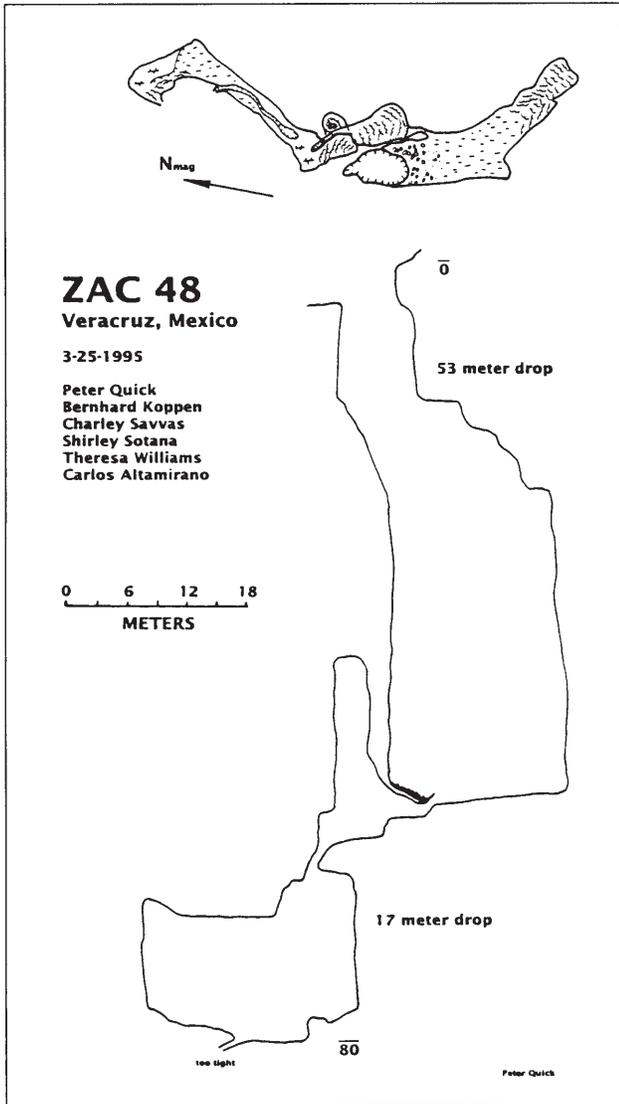
Aztec mythology. As soon as we reached the edge of the 15-meter-diameter sink, we knew we had a deep shaft. Rockfall indicated a 60-plus-meter pit.

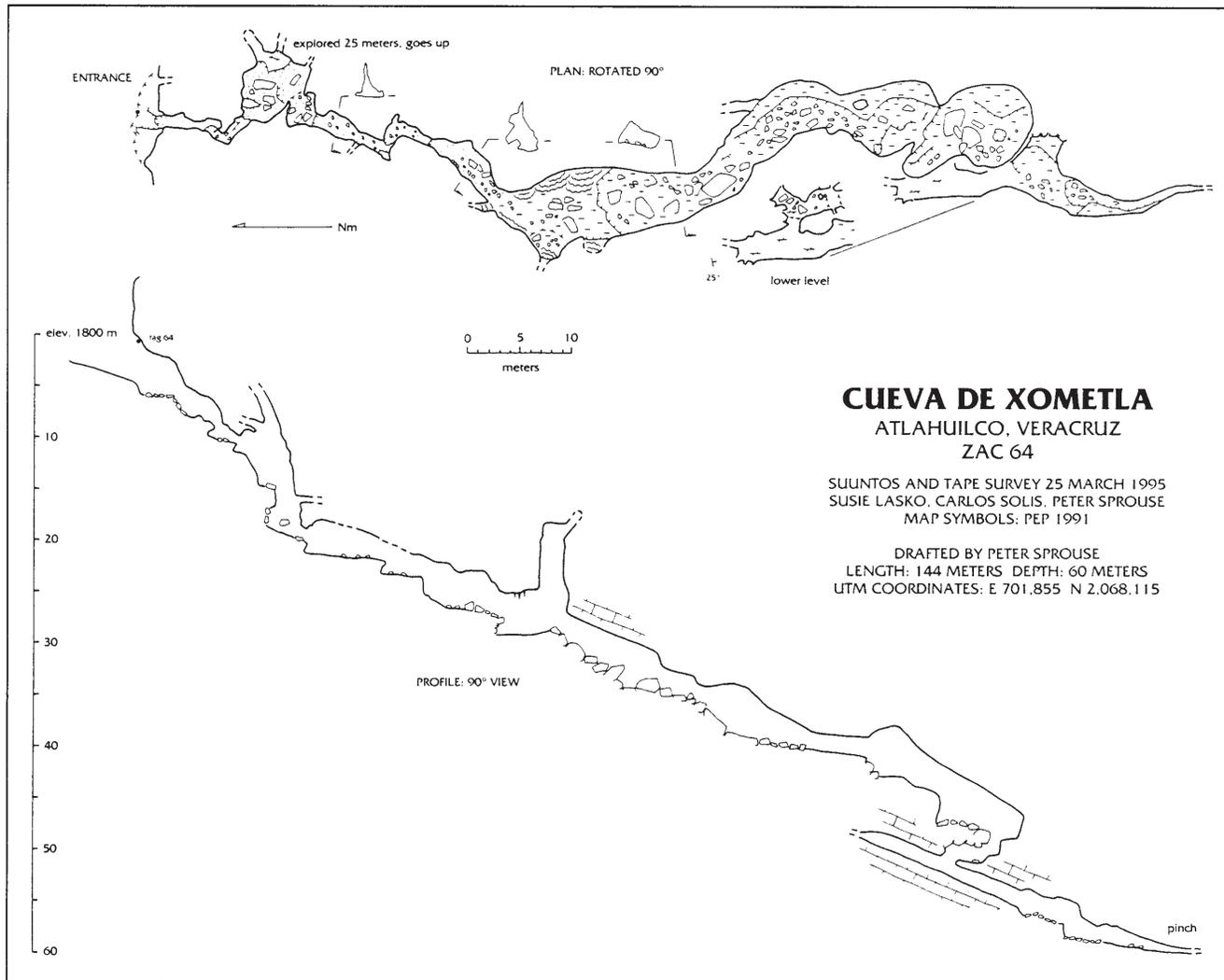
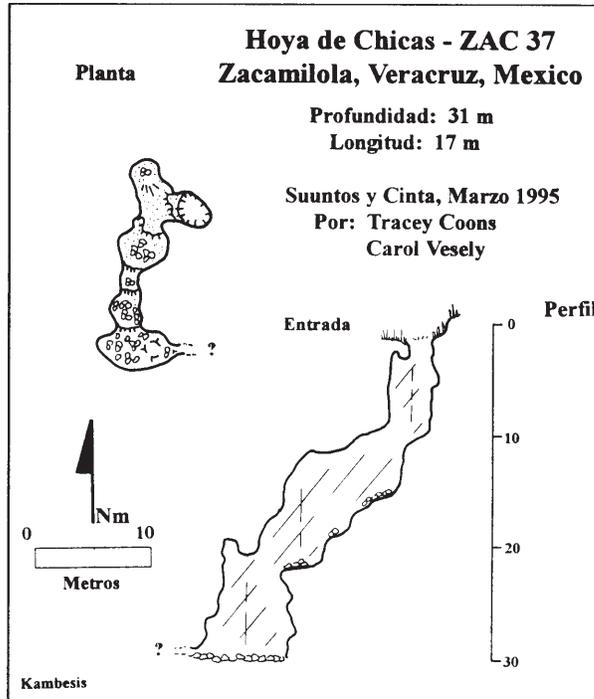
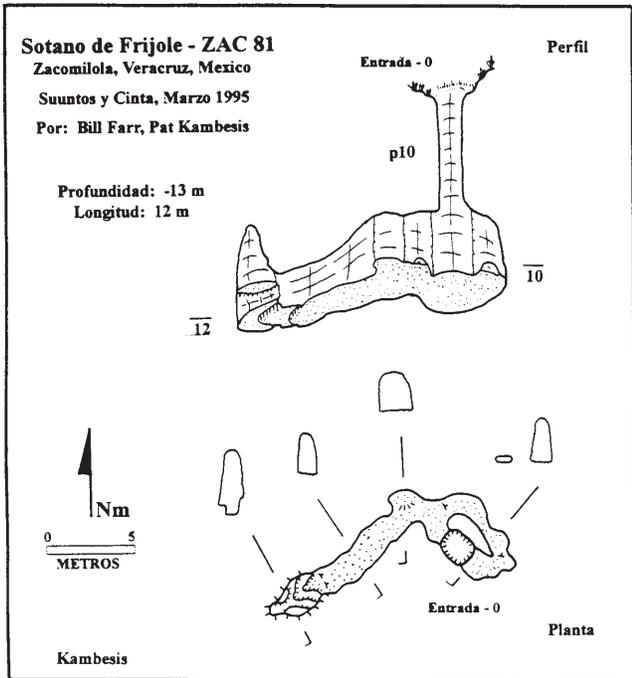
I rigged the pit with a 90-meter rope and descended 70 meters, where I determined that the rope did not reach the bottom. I climbed back up and got a short rope to tie onto the end. I passed the knot 5 meters above the floor. On the bottom, I could see a steep slope descending to another drop of 30 meters. I drilled bolt holes, as there were no natural tie-offs. Marion descended next, knocking rocks into the pit. Since rock-fall was a problem, I told the others to wait on the surface. I descended the 30-meter shaft into a huge space. Once on the bottom, I could see that it was a steeply descending passage. Marion followed, and we carefully descended the slope to the bottom of the cave, 60 meters from the rope. We surveyed from the bottom out, following the slope up past the rope as high as we could, or about even with the top of the 30-meter drop. When we climbed back to the bottom of the entrance shaft, we found that Christian had descended that pit without a helmet. He had forgotten it and left it at home, and he was lucky he didn't get a head injury. The entrance shaft measured 78 meters. The length of the survey was 300 meters, and the depth of the cave 165 meters. This would turn out to be the best discovery I was involved in during the expedition.

Mike and Andrea Futrell, Karen, and Andres Girón chose to use the local-children method of locating caves and were taken to Cueva del Campamento Niño, with a small entrance about 20 meters above camp. It was about 5 meters long. Later that day, Andrea and Mike, Pete Hollings, Ron Simmons, and Doug Strait discovered Cueva de Libélula Roja. This translates to Red Dragonfly Cave, which is a nice name for 50 meters of low crawlway.

Team Sprouse-Lasko found Sótano de Ostonacas. This sótano is located 2200 meters east-northeast of Atlahuilco at 2065 meters elevation. It is at the southeast end of a large sink, just to the east of the ridge crest that drops off to the east toward Tequila. A log spanning the







entrance had been used by locals to retrieve a stranded sheep from the 17-meter entrance drop. This pitch lands on a steep slope that goes over a short climb. Then the cave splits, with a too-tight drain continuing down and a narrow in-feeder going up. Peter and Susie also discovered, rigged, and explored 24-meter-deep Sótano del Borrego Despierto. When the names of the caves are getting longer than the caves themselves, it is time to quit for the day.

With a total of ten pits for the day, we were beginning to feel like the expedition was productive again. That evening we compared notes, cooked dinner, and strolled into town to find some refreshment. Perhaps with a little more work some good leads to something significant would turn up.

On March 27, a number of us went farther afield, to the Zacamilola area, hoping to find some incentive to keep beating the bushes. Carol and baby, Bill Farr, Don, Tracey, and I hiked farther and farther into the mountains, only to find less and less. Sótano de Frijole is a little 10-meter pit that we stumbled on while hiking across a bean field. There is an additional 10 meters of cave at the bottom of the pit, and it ends in a dome. An obvious hole at the base of a cliff opened into Sótano de Nova, a 10-meter pit that didn't go—*no va*. And the final discovery was an obscure little pit entrance off the side of another bean field. This time, Bill, Don, and I took turns baby-sitting little Brian, while Carol and Tracey rigged, explored, and surveyed Hoya de Chicas. They found 17 meters of horizontal cave at the bottom of a 31-meter combination rappel and climb down. A low crawl left the bottom of the passage. The dip of the limestone was 40 degrees.

Marion Smith and Karen found more of the same: lots of hiking, not so much cave. Sótano Uisquilapa is a 7-meter pit with a 5-meter slope to a 12-meter pit. Mike Futrell and Doug Strait stumbled on Sótano de Pañal Usado, an 8-meter pit full of diapers, which might

explain why the Belgians didn't explore it, though it was only 100 meters northeast of one of their finds.

Peter Quick, Charley, Teresa, and Bernard were guided to another pit, which Peter named Hot Pot. It took quite a while to rig and map this 53-meter-deep pit. They had to tie two ropes together and place two rebelayes and a redirection to get to the bottom. Once there, they found the initials "ESS 87" scratched in flowstone. Much to their disappointment, they had followed in the footsteps of the Belgians. Bound and determined to find something new in this apparently dead-end pit, Charley did manage to dig through some organic fill and into a virgin room with lots of flowstone.

Jim Smith: A reconnaissance team consisting of Marion, Karen, Shirley, and me drove to a new area, in the community of Zacamilola, which is located north of Cerro Zacatecochapa. We asked the locals about pits or caves, and they pointed out a few dud holes and several pits up to 20 meters deep. The most significant find we made in two days there was Sótano de Oztotil. Named for the cave god, this cave had no doubt played some role in pre-Columbian society. Located on an aerial photograph by Peter Sprouse, Sótano de Oztotil was a large-diameter pit measuring 50 meters across. A horizontal entrance allowed access to the bottom of the shaft via a 5-meter climb down a ladder. Inside the pit, which had a longest possible drop of 30 meters, we could see flowstone that looked like gargoyles arching into the pit. Some of the gargoyles were 6 meters long. A parallel dome pit offered a third entrance to the cave. The smaller dome pit was beautifully decorated with flowstone. A small bowl had been set, probably as an offering, at the base of the flowstone.

In Atlahuilco, Peter and Susie found Sótano de Cuauhtlaquichapa, located in a large sink 1600 meters east-northeast of town, at



Doug Strait at Sótano de Tlaquilpa. *Pat Kambesis.*

an elevation of 1960 meters. The cave was mapped by Bernard, Teresa, Charley, Peter Quick, and Ted Wilson. The first drop is about 50 meter deep, broken by a rebelay halfway down. Beyond two more pitches, of 5 and 7 meters, the push crew reported that they needed more rope. Ted climbed out to get more, while the others continued the survey. He returned with five short ropes and joined the survey team. Just as the next pitch, of 10 meters, was surveyed, word came back that extra rope wasn't needed after all. The 16-meter last pitch led to a passage that ended in a tight, narrow fissure.

Peter and Susie mapped Cueva del Dolor de Cabeza, which is located on the northwest side of the large sink that contains Cuauhtlaquichapa. The entrance opens at the base of a cliffy cleft. The cave descends steeply as a tall rift to an undescended drop of about 5 meters. Exploration was not completed due to lack of time, but the survey was begun.

Doug Strait, Ron Simmons, Pete Hollings, and Mike and Andrea Futrell explored some small pits around Zacamilola. Sótano de Pulque is a shattered, offset pitch

of 34 meters. Chivalry Pit, Hoyo de Caballerosidad, was descended by Andrea and named because the four men in the party gave her the honor of the first descent. (Andrea tells a different story.) Later in the day, some locals took the group to a large sinkhole. They noted a blowing lead in the back of the sink, and, after some digging, Mike was able to fit into the entrance and check it out. He discovered a 16-meter drop to another pit. A pool at the bottom of the drop drained through a narrow fissure. For the next two days, small, skinny, and persistent cavers worked their way through two more constrictions. Lack of time ended the push and survey of Cueva de Desagüaderos Martillados. The cave continues and has a steady draft.

Although another twelve pits were added to the total find in the Atlahuilco area, the quality, extent, and potential of the discoveries were not enough to prevent the beginnings of a rout. The nerd-hole syndrome had gotten to be too much for most of the members of the expedition, and there was talk of going to bop 330-meter Tomasa Kiahua or do the 170-meter rappel past the 70-meter-high entrance to El Boquerón and into the river. Others in the group wanted to see some of the springs in the Tlilapan, Mendoza, and Orizaba area. It didn't take much to convince the entire expedition that it was time to pack up.

On the final day of the expedition, Doug Strait, Pete Hollings, and Vicente Fuentes went to Zacamilola, on a small-pit blitzkrieg. They discovered, explored, and tagged five more Mexican nerd holes. ZAC 124 is a 24-meter-deep hole that has dimensions of 8 by 3 meters at the top and 20 by 9 meters at the base. A second entrance is visible from the bottom of the pit. ZAC 107 is a small pit beside the trail that is 12 meters deep and 4 meters across at the bottom. A small window halfway down the pitch drops into a parallel pit of equal depth. ZAC 99 is located in a tall cleft in a cliff on the north side of a farmed depression. Vicente was able to climb down a 70-degree slope to a small pit that drops into a little chamber. ZAC 97 has a sloping entrance ramp that drops into a mud-filled room. And, finally, ZAC 77 is a low, 2-meter-long crawl that opens into 6 meters of walking passage to a sediment block.

The Sotona sisters, Don and daughter Tracey, and I spent the last day touring the springs that flow into the Río Blanco from the northwest side of the Sierra Zongolica. Of the four springs that we saw, only one was enterable, the others issuing either from breakdown or the absolute base of a cliff. We entered the one through an old, upper-level passage. We checked out about 200 meters of passage, a lot of it occupied by bats. We did not know whether this cave had

been mapped, so we went ahead and surveyed it. Later, I discovered that we had remapped Cueva del Ojo de Agua de Tlilapan, which had been surveyed in 1973 by David McKenzie, Stuart Murphy, and James Reddell. (See *Association for Mexican Cave Studies Newsletter*, volume 4, number 3.)

Although we did not find any significantly deep cave systems, or shallow ones for that matter, or any gaping deep pits, in terms of overall productivity the expedition was a success. A total of twenty-three pits and caves were discovered, tagged, and mapped from base camp in Tlaquilpa. There are still good leads shown on aerial photos or topo maps, and we left going cave. Perhaps sometime in the future a smaller group will have better luck with local politics and be able to pursue those promising leads that remain. In the Atlahuilco area we scored another twenty-seven pits and caves, a few with interesting leads, though most were just dud holes. Despite the Belgians' and our efforts to look for caves and pits in the area, another good look wouldn't hurt.

The expedition proved that given enough limestone, even under adverse social conditions and time limitations, a bunch of motivated and driven cavers can be outrageously productive, have a good time, and still not find anything much.

Expedición a Tequila en 1995

En marzo de 1995, cueveros de EEUU y del Club Veracruzana, acompañaron en el pueblo de Tlaquilpa y Atlahuilco, cerca de Tequila, Veracruz. Vientitres tiros y cuevas fueron encontradas y topografiadas en los alrededores de Tlaquilpa, y vintisiete en los alrededores de Atlahuilco. Desafortunadamente todas las cuevas y tiros fueron pequeñas y ningún sistema ó tiro profundo fué encontrado.

1996 EJIDO JACINTO PAT EXPLORATIONS

Steve Gerrard

Jacinto Pat was the first Mayan warrior to die in the War of the Castes against the Spanish. The Ejido Jacinto Pat is a group of over one hundred Mayan families. Each family owns and occupies its own land, and there is also community land. Altogether, the ejido, which meets on the last Sunday of each month to discuss and decide land-use policies, controls over 8400 hectares of land on the beautiful Caribbean coast of the Yucatan Peninsula, in Quintana Roo between Aventuras Akumal and Tulum.

This huge tract probably contains over a hundred cenotes. A cenote, or natural well, is a collapse in the soft, porous limestone that gives access to the water of the peninsula, where there are no surface rivers or streams and all water rapidly drains underground. There are over a dozen underwater cave systems known on the ejido, including the two world's largest, Sistema Nohoch Nah Chich, meaning Giant Birdhouse, and Sistema Dos Ojos, the Two Eyes. The world's best cave diving exists here.

Sistema Dos Ojos was first discovered and explored during June 1986 by Jim Coke, who now lives near Houston, and Johanna DeGroot, who now lives in the Fiji Islands. During 1986, it grew in length to 3000 meters, before exploration ceased for several years because of the difficult access over an abandoned and illegal logging road. Nohoch Nah Chich was discovered and explored during 1988 by Mike Madden of Puerto Aventuras. He recognized the tremendous potential of his discovery and immediately made an agreement

with the land-owner, Don Pedro, and he arranged for the clearing of trails and the use of horses to carry the necessary equipment to the cave. Since 1988, Mike has organized annual expeditions of several weeks to explore the system, and he developed a very successful snorkeling and jungle-touring trip for tourists from the many hotels on the coast and the island of Cozumel. Since the initial discoveries, over two hundred cave divers have had the opportunity to explore and survey in these two mammoth systems.

It was 1992 before interest in Dos Ojos began to revive. Through the efforts of Buddy Quattlebaum, who had recently moved to the area from Florida, a healthy relationship with the Mayan ejido was established, and he started a business promoting snorkeling and diving in the Dos Ojos cenotes. With the help of the ejido, the old and very rough road was cleared of jungle growth and fixed so that at least four-wheel-drive vehicles could travel on it. This allowed access to Dos Ojos and several other nearby cenotes. No formal expeditions were organized, but, as the years went by, exploration continued through the efforts of various individuals who were motivated to dive there. By the end of 1992, several other cenotes had been connected, and the length of the system was 7500 meters. During 1993, it grew to over 12 kilometers. In 1994, through the efforts of Gary and Kay Walten, Steve Gerrard, Buddy Quattlebaum, Dan Lins, and several other cave divers, the system leapt to over 27 kilometers. For

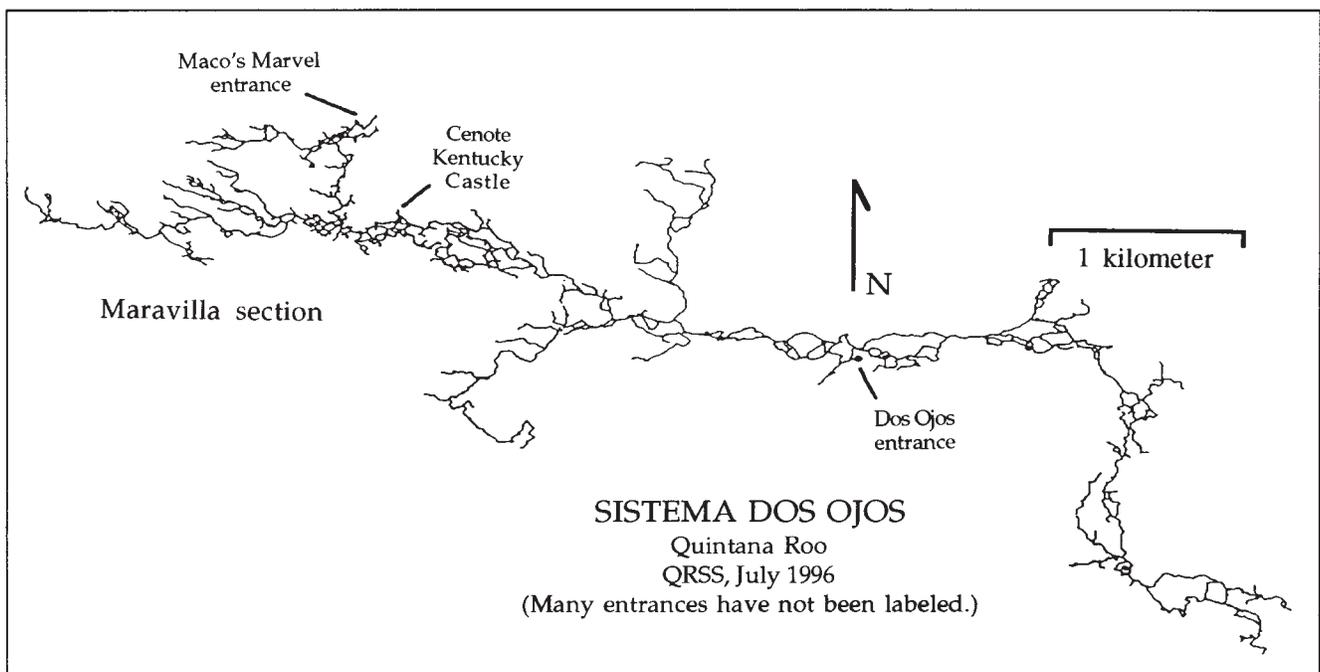
three months it was longer than Nohoch Nah Chich.

During late 1994 and 1995, the exploration of Dos Ojos slowed. One interesting discovery took place in the area known as the Southwest Canyons. Kay Walten and Dan Lins discovered a unique pit. The typical depth of Dos Ojos is 8 meters, but this pit reached a depth of 75 meters. This strange and beautiful pit unfortunately did not lead to an extensive lower cave system, though. By the end of 1995, Sistema Dos Ojos stood at approximately 34 kilometers of explored and surveyed passage. In the fall of 1995, an article appeared in *aquaCORPS Journal*, a popular technical-diving magazine, featuring the competition between the two caves. This spurred the creation of the 1996 Ejido Jacinto Pat Exploration Project, which was to increase the size of Dos Ojos by two-thirds during the next few months. The project officially began on January 12, 1996, with a "grand finale" during June.

Bill Stone, famous rebreather engineer and cave explorer, said it best: "The greatest piece of work in a finite amount of time." During the two-week finale of the project, the Ejido Jacinto Pat Exploration team was able to install 15 kilometers of surveyed guideline in Dos Ojos. Most importantly, they succeeded in connecting the old end of the system to the Maravilla section to the west, which had been explored through the Maco's Marvel entrance. The connection was made through the Mouse Hole, a tiny restriction upstream from Cenote Kentucky Castle. The "no mount" connection was made by



Project participants photographed June 15, 1996. **Front row**, left to right: Leo Sastre, Pierre Turgeon, Gary Lemme, Kevin Renton, Claudia Tolentino, Buddy Quattlebaum, Nancy DeRosa, Tony DeRosa, Jill Rabjohn, Paul Heinerth, Rosemary Redgen, Micheline Coutlee, Travis LoRe, Thorn Filippelli. **Middle row**: Jim Osborne, Donn Ellerbrock, Michael Menduno, Wayne Nefzger, Keith Kinard, Brian Kakuk, Bil Philips, Sue Sharples, Chris Plye, Kay Pozda Walten, Rich Chapski, Ed Grossenbucher, Connie LoRe, Steve Gerrard. **Back row**: Steve Irving, Pat Watson, Steve Berman, David Minor, Pable Diaz, Gary Walten, Bob Griffith, Steve Keene, Lee Gibson, Jonathan Lesh, Sandro Mateo, Bill Rennaker. **Other participants** not shown: photographer Bill Dooley, Kenneth Furman, Kevin Mack, Sam Meachem, Lance Milbrand, Andrew Pitkin, Daniel Riordan, Issac Villanavue, Tom Young.



Brian Kakuk and added 8 kilometers of previously surveyed line to the system. After the formal end of the project, a further 2 kilometers of survey has been added, making the total length of Sistema Dos Ojos about 60 kilometers, over 195,000 feet. Growing past the milestone of 200,000 feet should be no problem. The rival Nohoch Nah Chich went over that milestone during the Cedam Cave Diving Exploration Team's October-November project. Both caves are among the top twenty-five in the world, wet or dry, in length.

There will be no formal expedition to Dos Ojos in 1997. Instead, any qualified cave diver is welcomed by the Ejido Jacinto Pat to come and explore at any time

during the year. Divers will be required to register with the ejido and pay the diving fee. All exploration line must be surveyed and the data submitted to the ejido so it can be added to the map.

The seesaw struggle in length between the world's two longest underwater caves, located in the same area, created a competitive drive among the explorers of the systems. Many divers have worked in both systems and contributed to their growth. As the caves grew larger and closer to connecting, the publicity highlighted the beauty of the caves and the spirit of their exploration, but negative aspects of the rivalry also occasionally appeared. No one would have predicted that the caves would come within 80 meters of each other with-

out an underground or underwater connection. Many attempts have been made from both sides, but some sort of magic wall seems to deny the marriage of these mammoth siblings. The day will come when they do become one, an underwater cave with more than 130 kilometers of passage, among the ten longest caves in the world. When that happens, it will be a victory not for the individual explorers who make the connection, but for cave diving and all those whose dedication, sacrifice, hard work, long hours, and huge investments have made it possible. And most important it will be a victory for the Mayan people of the ejido, who have in their possession a gift that they can share with everyone and be very proud of.

Sistema Dos Ojos

Durante 1996 buzos extendieron el Sistema Dos Ojos, en Quintana Roo, de 34 a 60 kilómetros. Quince kilómetros de pasaje subacuático se topografiaron en Junio. Mucho del pasaje nuevo consiste en una extensión hacia el oeste, que se conecta con el sistema principal por un entrada pequeña. Los buzos siguen con la búsqueda de una conexión con el cercano sistema de Nohoch Nah Chich. Las dos cuevas se acercan una a la otra a una distancia de 80 metros, si se encontrara un pasaje de conexión, la longitud total del sistema sería de más de 130 kilómetros.

ZONGOLICA, OAXACA, WINTER 1995–1996

Alan Warild

The aliens don't frighten the local Indians, but they do have them well and truly baffled. If they woke pre-dawn to see the wandering light descend from the hills towards their primitive village, there'd be no panic. They see enough of these aliens, these gringos locos, to know not to fear them. They see them set off daily in their strange suits and gum boots, with their helmets fitted with a third eye and sacks full of rope. They see them enter the caves of their jungled backyard to emerge hours, sometimes days later laden with nothing to show for it but exhaustion and hunger. No gold, no precious stones, no treasure. Bugger all . . . Well that's how the Inside Sport journalist saw it, anyway.

After twelve years and six expeditions to the Chilchotla side of the Sierra Mazateca, after the countless bolts, topofil thread, and drowned compasses, after the bruises, broken bones, and *caña* hangovers, you'd think we'd finally get it right. Well, we did. Apart from the almost complete lack of sponsors—nobody wanted to pay us for a holiday in Mexico—everything just ran like clockwork. After a pleasant couple of days helping Diana carry bug tubes around Lechuguilla and having a pleasant chuckle at people who make a big thing of Boulder Falls, we headed south toward Oaxaca. We scored a green light at the customs post and didn't even get caught for any bribes on the long ride to Tehuacán. The *cuota* roads may be expensive, but they sure have made a difference in

Greg Tunnock returning from his successful dive through the Unsealed Siphon. *Alan Warild.*

long distance travel in Mexico.

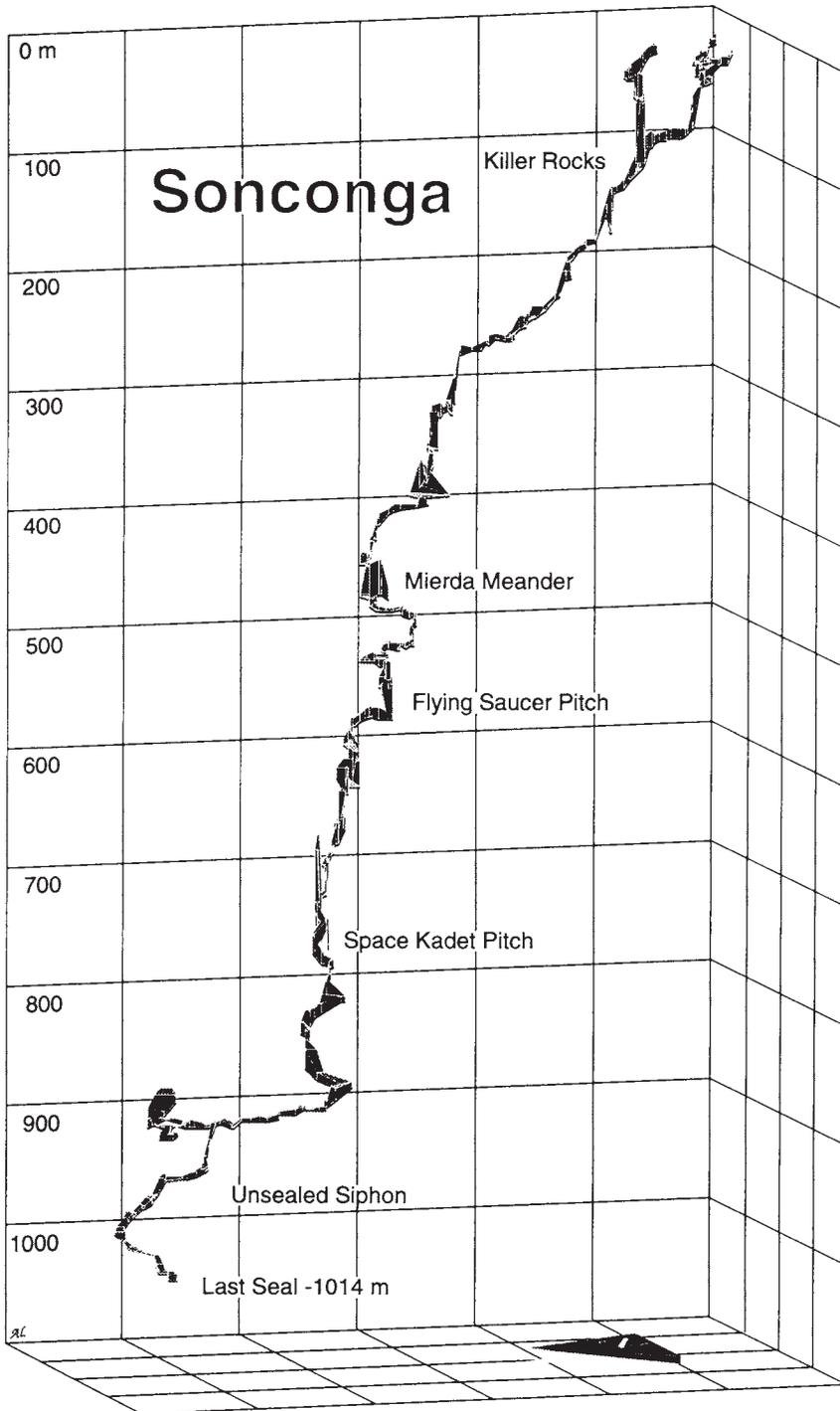
Our group of ten Australian cavers moved in on Zongolica for the sixth time, with three objectives: Push Sonconga (Klub Cave) from 946 meters to somewhere beyond -1000 meters. Finish off Nia Quien Nita (Dead Dog Cave) and try to find a higher entrance. Have a good time.

Our first objective was to re-rig Sonconga down to the -946-meter sump, then dive through and find the master system that surely lay beyond. In preparation, we borrowed a couple of small (OK, tiny) tanks. The little one looked like a thermos flask and held sixty (count them!) breaths, but at only a meter or so depth it would last a good ten minutes. More importantly, it and its larger brother were small enough for us to carry down the cave. Sonconga is one of those uncom-

promisingly sporting caves typical of Zongolica, 946 meters deep in less than 2 kilometers total length. You don't get to walk far between pitches, but you sure get pretty good at technical ropework and prusiking. The upper reaches are nothing special, but below the Mierda Meander at -450 meters the cave is clean, wet, and wonderfully vertical. We had rigged Sonconga twice before, once for the original exploration and a second time to check leads and try to free-dive the sump, so we had it pretty wired and got to the bottom on the third rigging trip without ever running out of rope.

The idea, before lugging dive gear down there, was to have a go at the drafting, possible sump-bypass lead left by Rolf in 1987. Getting people to drag tanks down a cave, sit around getting cold and bored for hours, then carry them





back out again can strain any friendship. Greg and I tried a climb that went only to some horrible mud-covered chambers and tubes. After a few hours, we groveled back out of the lead without having bypassed the sump, but at least we knew where the air was coming from, a series of small holes in a mud-caked rockpile. No hope of digging, but at least we had scuba gear this trip.

It was time to dive. None of us had done a dive at this depth underground before, and suddenly 946 meters was a really long way down. The plan was for Greg to dive through with the two tanks and set the line. He would then return, and we would free-dive through. This of course relied on the sump being short, straightforward, and shallow. To encourage this, we had a dive reel with only 30 meters of line, so if the sump was too long, it would be left for the time when Zongolica has its own caving club. Greg dove the small, but nice, clean sump and laid out line for only about thirty seconds. This was real hopeful, as we had no easy way of supporting a major series of push trips beyond a serious sump. He returned with a story about a gushing stream canyon on the other side, and half his line left. Fifteen meters is a long way to free-dive, so Greg put a rope in, and I took the thermos flask. The support team sat around trying to amuse themselves eating pasta out of plastic bags, but most of them eventually left for the surface.

On the other side of this sump, the Unsealed Siphon, was the roar of water once again. We placed the dive toys out of the way, took an altimeter reading, and set off down. The stream dropped out of the steep canyon into a silent, bouldery chamber. Only 40 more meters of depth so far. The rocks got muddier and muddier, and, after a delightful 45-degree mud pitch you'd climb down easily, but never climb back up, we found sump 2, the Last Seal, a larger, silty pool with no flow, definitely beyond our technology on this trip. The altimeter said 90 meters, but you can never

trust them. We surveyed back, checking for leads on the way, and got the hell out of there, derigging the sump as we went. Mark was the only survivor among the support crew. He'd put a lot into Sonconga, and, even though he didn't have a wetsuit or like diving, he sure wanted to know how it went. (The seal references are a joke. The locals once thought we were taking seals out of the caves and selling them.)

Back in the house at 9:30 A.M., we added up the survey and got 68 meters of added depth. Not a world record, but with a total depth of 1014 meters we'd cracked 1000 meters at last. Sump 2 is only about 10 meters above the level where several other caves in the area end, so we hadn't held much hope for much more depth.

You can't do deep trips every day, so in between Sonconga trips we found Nia Nga'co Nita, Top Dog Cave. Nga'co is about 130 meters above the entrance to Nia Quien Nita, Dead Dog Cave, a cave we'd found in 1985 and pushed bit by bit to -767 meters over several trips, but never really gotten excited about because of the low altitude of its entrance. When we found Nga'co, we began dreaming of two thousand-meter holes on one expedition.

While Nia Quien has a nice entrance pitch, it also has some nasty cave coral and a few delightful squeezes where the tiny stream trickles down your legs as you wiggle through or the dust blows into your eyes. It is generally un-aesthetic. Nga'co, on the other hand, is an excellent cave with a nice little stream in it and only one place where you have to remove your pack. Nice comfortable meanders with small pitches are mixed with some bigger drops, like the Avalanche Poodle, a 170-meter series of pits, the top 40 meters of which is lined with lovely razor blades. You can see and throw rocks all the way down. This lands in a streamway at about -500 meters that hoots on down dip, heading who knows where. Nga'co was going so well we wanted it to miss

Nia Quien and go all the way on its own. The Nga'co team turned around after looking down a 25-meter pitch into a big pool in a stream canyon.

Meanwhile, Shane, Jason, and Roger whipped on down Nia Quien and had a look in Perro Perdido, the hot lead left two years before. They dropped one more pitch, and the stream went almost straight into a rock-pile. Upstream, it came down a pitch into a nice green plunge pool. The Nga'co survey was a few hundred meters away, but it sure looked like the two dogs were about to meet.

Greg got the honor, and, sure enough, around the corner from the last drop in Nga'co was a rope hanging down from the blackness. The others had made the connection, but at least we got to do the first through-trip. The new system had suddenly jumped to just less than 900 meters deep and nearly 7 kilometers long.

The only worthwhile lead remaining was the long, horizontal Snoopy Flies Aeroflôt passage. It headed off away from the rest of the cave, presumably going toward the resurgence. This place was a long way from home during a rushed trip a few years ago and was not really looked at well. We found some pathetic little leads, but the only one that had a hope was right at the end, in Goofey Gets It. Not the most appealing place on earth, but definitely a going lead. I suspect that Rolf and Steve, the only other cavers to have gone there, simply chose not to see it. Lots of nasty, tinkly brown coral led to a mud-lined old stream canyon. One of the worst places we'd found in Zongolica, but it did overtake the previous deepest point in the cave, Lassie Meets a Semitrailer, before it ended. Que Perro Tan Feo, What an Ugly Dog, was the last nail in



Greg Tunnock in the stream passage in Nia Nga'co Nita, heading toward Perro Perdido and the connection to Nia Quien Nita. Alan Warild.

Dead Dog's coffin. With the Sistema Perrito 906 meters deep and 7.15 kilometers long, we were only a little sad that the dog was finally dead, but mainly we were relieved that such a horrible passage had ended.

During our six trips to the area, we had never found the time to look for the resurgence to the caves. As far as we knew, water just flowed in and disappeared. On the last possible day, we did a trip down the Río Petlalpa gorge to the west of Zongolica and found a truly magnificent canyon, complete with lethal amounts of water, some great jumps, rather too much rubbish, and no resurgence, proof, obviously, that the water just flows into the caves and disappears.

The score card from five weeks in the field: 3982 meters more length and 1158 meters more vertical

Sistema Perrito

Darker shading indicates new discoveries.

Nia Quien Nita

Le Chien Mort
Dogs Breakfast
Dogs Bum
Chunder Dog
Snuffed Mutt
Dog Drink
Lassie meets a semi-trailer -767 m

Croaked Canine

Perro Perdido

Snoopy Flies Aeroplôt

Nia Nga'co Nita

Screwed Pooch

Avalanche Poodle

Canine Colon

Goofey gets It

Que Perro Tan Feo

AL

-906 m

added to the Zongolica area, another thousand-meter-deep cave for Mexico, and a good time had by all. Who says we emerge with nothing to show for our efforts? The final achievement, though, must have been when a Mexico City traffic cop stopped us for a bribe and, after some argument, called me a *mierda*, kicked the side of the van, and left us alone.

Thanks to all those cavers who have played a part in the exploration of the Zongolica area, to the people of Zongolica who have hosted their very own band of "gringos locos" over the past ten years, to Ken, Diana, Ziggy, and Fritzzi, who have looked after us so well in Albuquerque, and to the Australian Geographic Society, who have given us financial support on several occasions.



Greg Tunnock on the connection pitch between Nia Nga'co Nita and Nia Quien Nita. The rope going up to Perro Perdido is hidden just around the corner to the left. *Alan Warild.*

Mark Wilson in Snoopy Flies Aeroflôt, an easy and impressive walking passage that leads to the ugly Que Perro Tan Feo. *Alan Warild.*



Zongolica, Oaxaca, Invierno 1995-96

Los cueveros Australianos que han estado explorando las cuevas del área de Zongolica desde hace 10 años, finalmente sobrepasaron en una de ellas, los mil metros de profundidad. Un pequeño sifón que antes fuera la parte mas profunda de Sonconga dejó pasajes suficiente para encontrar una nueva profundidad en la cueva, 1014 metros. La nueva parte mas profunda de la cueva es otro sifón. También se encontró una nueva cueva, Nia Nga'co Nita, el cual, tiene aproximadamente 500 metros de profundidad, conectandose con Nia Quien Nita. El Sistema Perrito es 906 metros de profundidad y 7.15 kilómetros de longitud.

CUACHALALATE CAVE

John Pint

We had long been interested in searching for deep pits in the limestone hills above the rancho known as Fortín in the Pihuamo River area of Jalisco. Pozo Fortín hadn't led us down to the big system we're sure is under there somewhere, so it was time to look for a new connection. One day in October 1995, Claudio Chilomer, Chris Lloyd, Susy Pint, Nani Ibarra, and I decided to take a look.

"Before we go, why not call up Ramón Barajas of Tecalitlán?" I suggested, hoping he might be free to show us, at last, a cave he'd mentioned about two years ago, located near the road between Tecalitlán and Pihuamo. The next day we found Ramón waiting for us in front of the bee hives near Side of the Road Cave, which is famous for its friendly little "talking" bats. He and his son then led us up into the lush green hills below La Tigra peak. "This is not the best time to go looking for a little hole I haven't seen since I was a kid," commented Ramón, swinging his machete vigorously. Indeed, the vegetation was luxuriant, and we came upon all sorts of vines and plants we'd never seen before, including several that coat the passing visitor with tiny, hairlike needles called *ajuates*.

Eventually, whitish karst outcroppings began to appear, and at a spot called Puerto del Tabaquillo, we fanned out to search for the hole. Fanning out in a thick jungle of thorns and vines growing around and above great chunks of prickly rock means we all took one step

forward and found ourselves nose to nose with a seemingly impenetrable wall. "How in the name of Zotz do we get through all this?" Claudio, however, must have learned a trick or two as a Brazilian Bush Baby, for he managed to squeeze a whole two meters into the tangle, whereupon the old Chilomer luck struck again. "I found it!" he shouted. Practically on my belly, I crawled over to Claudio's find, picking up plenty of new *ajuates* along the way. Just then Chris and Susy shouted from even deeper in the thicket. "Forget Claudio's hole, Ramón just found the real one."

But I had already joined Claudio and had little desire to forge a new path through the jungle, so I climbed down to the landing a few

meters below and discovered that Claudio's hole showed plenty of promise. The walls were covered with flowstone, and off to one side was a crawlway sloping down. There was also a curious formation on the floor. It was cylindrical and hollow inside, something like a petrified tree stump, but apparently a genuine stalagmite of some sort. Chris, meantime, had climbed down Don Ramón's hole and was shouting up news about a big chamber and plenty of formations. Claudio and I were not ready to give up on our hole, however, even though it was so hot inside that I had to spend more time wiping off my glasses than wearing them. About the time Claudio, on belay, had reached the end of the crawlway and was peering into what



Mexican cavers Susy Pint and Luis Rojas in Side of the Road Cave. *John Pint.*

looked like a black abyss, we heard Chris's voice coming from further below. Connection! Soon all three of us were gawking at the surprising number of formations that decorate this cave. Although it is basically one big room, it really takes hours to have a good look around. Besides the two entrances we had found, there are two skylights in the ceiling, one of which would be ideal for photos of someone rappelling past a forest of lovely stalactites. As far as living creatures go, we found several large *canclos* (whip-tail spiders as big as your hand, with black fangs and scorpion-like pincers), one *chinche hocicona*, the inch-long "big-mouth bedbug" with a long needle used for sucking blood, and more of the chattering bats seen in Side of the Road Cave.

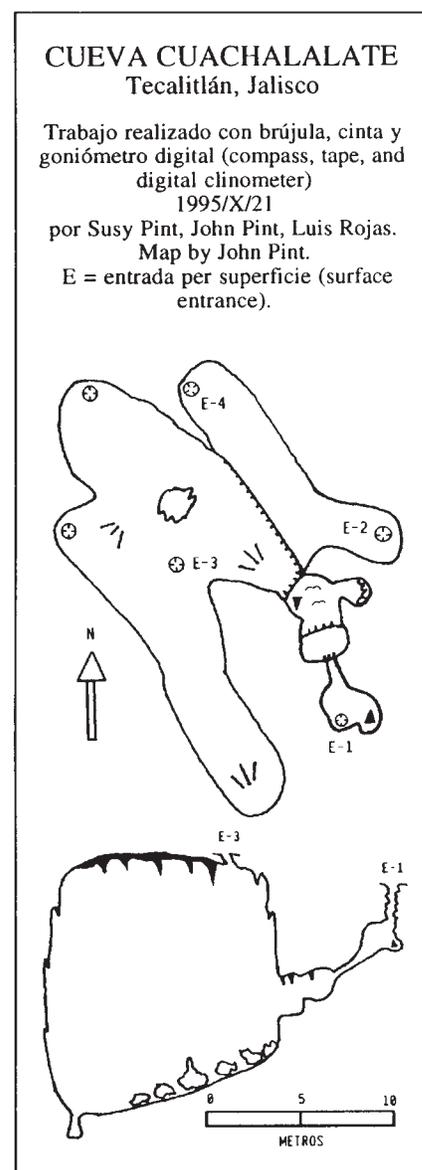
Chris Lloyd in Cueva Cuachalalate. *John Pint.*



As we crawled out, we were amazed to see Ramón busy talking on the telephone, apparently as comfortable with a telcell in his hand as with a machete. Ten minutes later, we were down at the roadside, trying to wash off the *ajuates* and *güinas* (chiggers) in a cool and delightfully refreshing spring-fed brook, after which we headed for our favorite caving grounds near the little settlement of Fortín.

On a subsequent visit to this cave, our mapping endeavors got us into several dusty passages, and everyone present ended up with histoplasmosis, even I, who was supposedly immune. For Luis Rojas, it was histo case number eight, which may be the reason he suggested the name Cuachalalate for this cave, a name so difficult to remember that it immediately suggests "forget this place" to the would-be visitor. (Supposedly it refers to a tree near the entrance.)

Any place with nine teen pits sounds like cavers' heaven, but I've cheated a bit because we began counting from Pit Fortín, that wonderful hole we hope connects with the Pihuamo River caves. Fortín is pronounced just like fourteen, so naturally we gave the name Pit 15 to a pit shown to us by Jesús, son of Don Rafa, the morning of October 8. After a brisk, ever upwards walk, there we were peering down into a pitch-black maw, when Susy leaned against a tree that happened to be a tall prickly-pear that happened to be rotten and that immediately fell right on top of Chris, who slid halfway into the pit before a couple of us managed to grab his arms. We then convinced Chris that it might be safer, if admittedly slower, to climb



down the cable ladder, which he did. Unfortunately, neither this cave nor the next had going passages, and we went on with Jesús to Pit 17, which proved too long for the cable ladder. This one is 15 meters deep by the old rock-on-a-thread method and looks worth a rappel.

Next we found ourselves in the middle of a cornfield, looking down a hole whose entrance was home to a swarm of small wasps. Our guide immediately and without warning applied the traditional wasp dispersal maneuver universally practiced by country folk: whack 'em hard and knock 'em on the ground. Of course, all the rest of us gasped and dove for shelter, but Jesús' technique worked fine, and the wasps

departed. This hole also proved too deep for the ladder, so we'll be seeing Cornflakes Caverns (Susy's name for it) again some day.

Hole 19 was quite different and is located on another hill, only three minutes from a convenient dirt road. A little 2-meter drop brings you to a sloping floor that leads to a big, beautifully decorated room. There are plenty of large *canchos*, too, but no sign of our dream passage down to the river caves.

So, in a few hours we visited five pits in the hills above Fortín, and we suspect there are many more. It's another fine caving area not

unlike the famous Cerro Grande.

After a cold beer with Don Rafa and Jesús, we drove off, all of us crossing our fingers that the gasoline dripping from beneath Chris Lloyd's recently purchased "semi-new" truck would not take us to the Great Beyond instead of Guadalupe. By the time we reached Pihuamo, the drip had become a trickle, but neither food nor a mechanic could be found in Pihuamo that Sunday, so we drove on to Tecolotlán, trusting in the same supernatural beings that permit Mexican drivers to pass semis on blind curves overlooking thousand-foot

drops with impunity. And sure enough, we reached Tecolotlán, our trickle now a gush, and immediately sat down for a long-overdue lunch—first things first. Then we sought out a great mechanic who just happened to like working on Sundays. He replaced the truck's thoroughly rotten gas lines and patched one particularly bad connection with a kneaded mixture of laundry soap and sugar, claiming this was better than epoxy. Lo and behold, no more drips and no more fumes. Like most such repair jobs, it lasted just long enough for us to reach home and then went to pieces.

Cueva Cuachalalate, Jalisco

Esta cueva pequeña en el sureste del Jalisco es un salón con tres entradas.

BOOK REVIEW

Murciélagos de Nuevo León: Nuestros invaluable aliados. Arnulfo Moreno Valdez, with photos by Merlin D. Tuttle. Monterrey; 1996. 96 pp hardbound. ISBN 968-7644-01-X. (Publisher and price unknown.)

This is a coffee-table book on the bats found in Neuvo León and their conservation. It is heavily illustrated with color photographs and black-and-white drawings. (The photos of flights and in-cave masses of *Tadarida brasiliensis* were actually taken in Texas.) Introductory text is brief and elementary, but covers most of the aspects of bats that

will be of interest to the general public. There are even plans for bat houses. The book also includes descriptions of all the species found in the state, a few of which are illustrated by color photos, and a key to their identification.

The hardbound edition was printed in connection with the celebration of the four-hundredth anniversary of the founding of the city of Monterrey, in cooperation with Bat Conservation International and Grupo IMSA. There is supposed to be a future softbound edition that will probably be more widely sold. — *Bill Mixon*

CAVING IN NORTHERN COAHUILA

Peter Sprouse

Prior to the 1994 NSS Convention in Brackettville, Texas, I began to make plans for a pre-convention exploration camp across the border from Del Rio. Despite being adjacent to Texas, home of a thousand cavers, and having the second largest expanse of Mexican limestone, after the Yucatan Peninsula, northern Coahuila was almost completely unexplored for caves. This may seem odd, particularly in light of the fact that this border area requires no immigration papers whatsoever. But there are good reasons for this, since the area largely comprises large, remote private ranches secured by locked gates. But the real inhibition in the past was that the area had a bad reputation for lawlessness on the part of the authorities. Until the 1980s, travelers risked abuse by police with overly broad powers to combat drug smuggling. When the government finally got serious about cleaning up police corruption in the late 1980s, the problems diminished, and the caving began.

First into the area was Joel King, a San Antonio caver who had gone to school with Homero Amezcua of Ciudad Acuña. Homero told him of a pit on his Rancho Seco, an hour's drive west of town. Sótano de Amezcua turned out to be a significant find (see *AMCS Activities Newsletter 20*, "Mexico News," Coahuila, with map on page 12). It is a 65-meter pit at the bottom of a large sink, with several hundred meters of stream passage at the bottom. In this stream was found a

Much of this material previously appeared in the *Texas Caver*, volume 40, number 2, June 1995.

new type of blind catfish, different from the two other troglotic catfish known from farther south in Coahuila. This suggested the possibility of an extensive karst aquifer system. After the exploration and mapping of this cave, we learned of and gained access to other promising ranches farther west.

In November 1993, Jody Horton, Susie Lasko, and I met in Acuña with the owner of Rancho Corrales, which is located on the northern edge of the Sierra del Burro, southwest of Chupadero del Caballo. The owner's son was driving out to the ranch on a cattle-hauling run and would guide us there. We headed out the western road past Rancho Seco for several more hours. We were impressed with the distances involved in getting to these remote ranches. Finally we reached Rancho Corrales, nestled in a cove in the foothills.

We had been warned that the pit we were to visit had been used as a trash dump for the past eight years. A couple of bolts got us down the 22-meter shaft to the inevitable trash mound. I scrounged around for a few bugs, and we finished the survey and got out of there. They called this Abra del Pastor, because supposedly a shepherd fell to his death there years ago.

The rancher assured us that there were many more caves on his other ranch higher in the mountains, called El Nevado. But this was just a weekend trip for us, and we hadn't anticipated getting so far out into the desert, so we had to turn back.

In January 1995, I set off for the desert again, this time with Pat

Geery and Robert Crowder riding with me in the Trooper. It was pouring rain the night we passed through Acuña, so we decided to grab a hotel room for the night and drive the road out in the morning. Past the end of the pavement, the normally dusty road turned to mud, endless mud, negotiated in four-wheel drifts. I was glad to have the wide mud-grips on. Our worst problem was visibility, as the tires threw a constant rain of mud onto the windshield. The washer water soon ran out, and the wipers couldn't handle the load. To stick your head out the window meant a face full of mud. So at times all we could do is drive blind, letting the ruts carry us along like a train. It was an interesting experience.

After a time, we came across a mired pickup hauling a cattle trailer. It turned out to be our rancher's son. We offered to try to pull them out. They discussed my "jeepecito" dubiously among themselves and, having nothing to lose, said, "sure." I managed to get around them and lined up to pull them backwards. With everyone pushing, we crept along in slow-motion until they were free.

At Rancho Corrales, the ranchhands showed us the road up into the mountains and left us with a few verbal directions to find the way. It was an interesting drive, in fog so thick that we couldn't see the landscape we were driving through. It lifted a bit when we topped out on a mesa 400 meters above the plain. There we found Benito, the Rancho el Nevado ranch-hand, waiting for us. He lived with his family in a

Pozo de la Escalera Cristal

Mexico, Coahuila



Surveyed 14 & 16 June 1994

Don Bittle
Peter Grant
Paul Mozal
Ray Nance
Marion Smith
Steve Taylor
Brian Watkins

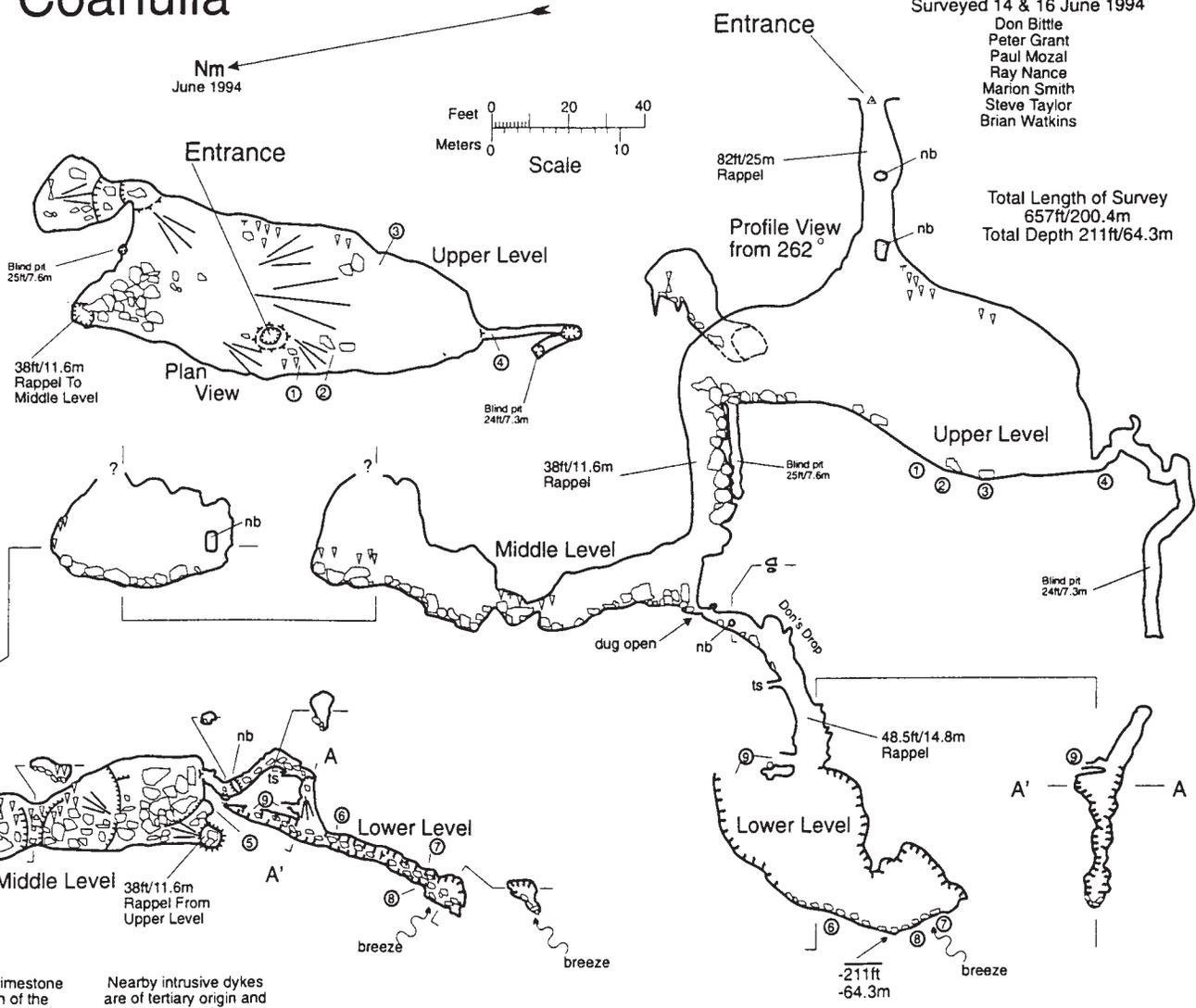
Scale:
Feet 0 40
Meters 0 10

Legend

- nb Natural Bridge
- △ Zero Datum
- Column
- ▽ Stalagmite
- ▽ Stalactite
- ▽ Soda Straws
- ▽ Coraloids
- ▽ Unknown
- ↘ Slope
- Pit
- ↖ Change in Floor Elevation
- ↗ Change in Ceiling Height
- ↘ Breakdown
- ts Too Small

Notes

- ① Human remains
- ② Clam shell
- ③ Deer skeleton
- ④ Snake skeleton
- ⑤ Bear skull
- ⑥ Cougar/Jaguar bones
- ⑦ Unidentified skull
- ⑧ Small cat bones
- ⑨ Caver's lights visible through openings

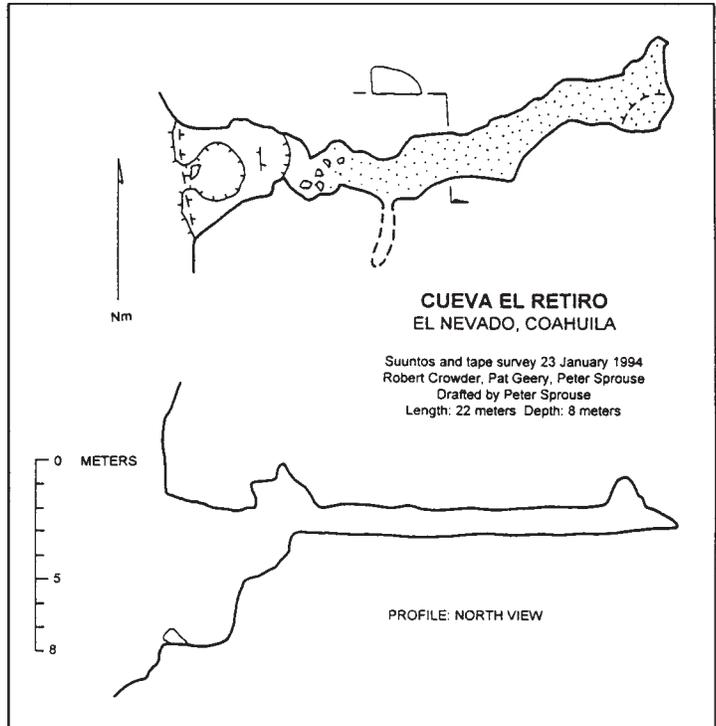
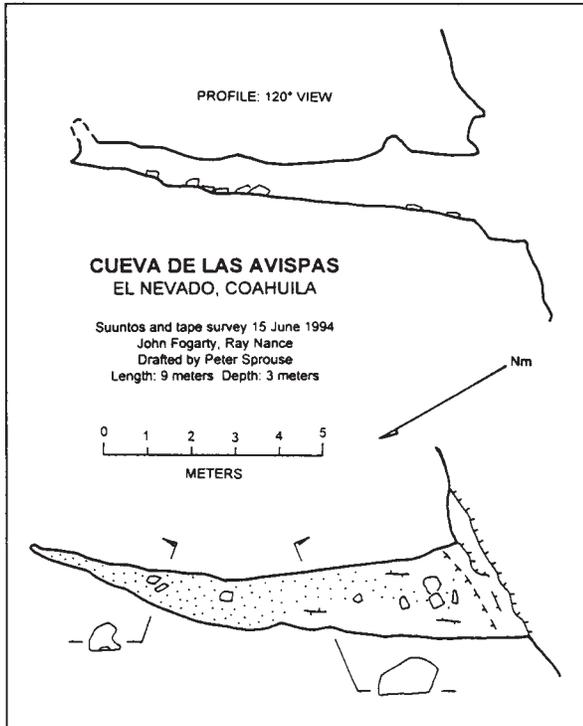


Total Length of Survey
657ft/200.4m
Total Depth 211ft/64.3m

Cave is in Cretaceous limestone at or near the junction of the Salmon Peak Formation and the Devils River Formation.

Nearby intrusive dykes are of tertiary origin and are composed of igneous rocks.

Map by Steve Taylor - Dec. 1994



quiet valley at the base of the impressive Cerro el Nevado, an igneous intrusion poking up through the surrounding limestone. He offered to take us over to the adjoining ranch where his brother worked, where we could stay in an old travel-trailer for the night. As it was still cold and rainy, we accepted. This ranch, also called El Nevado, had a few more *vaqueros* around, as well as a captive black bear.

The next day, Benito's brother took us on a hike down a canyon to the northwest of Cerro el Nevado. We were shown a number of good-looking entrances in the canyon walls, some of which would require vertical work to reach. We did check two caves at the base of the cliffs. Cueva Número Trece was tectonic in nature, with the roof soaring high up to a skylight. Cueva del Molcajete was a short formation cave that had been inhabited, as evidenced by a bedrock molcajete and smoky ceiling. Nice little caves, but not really what we were looking for.

Benito recalled having found a spot on the mesa where a strong wind blows out of the ground, but

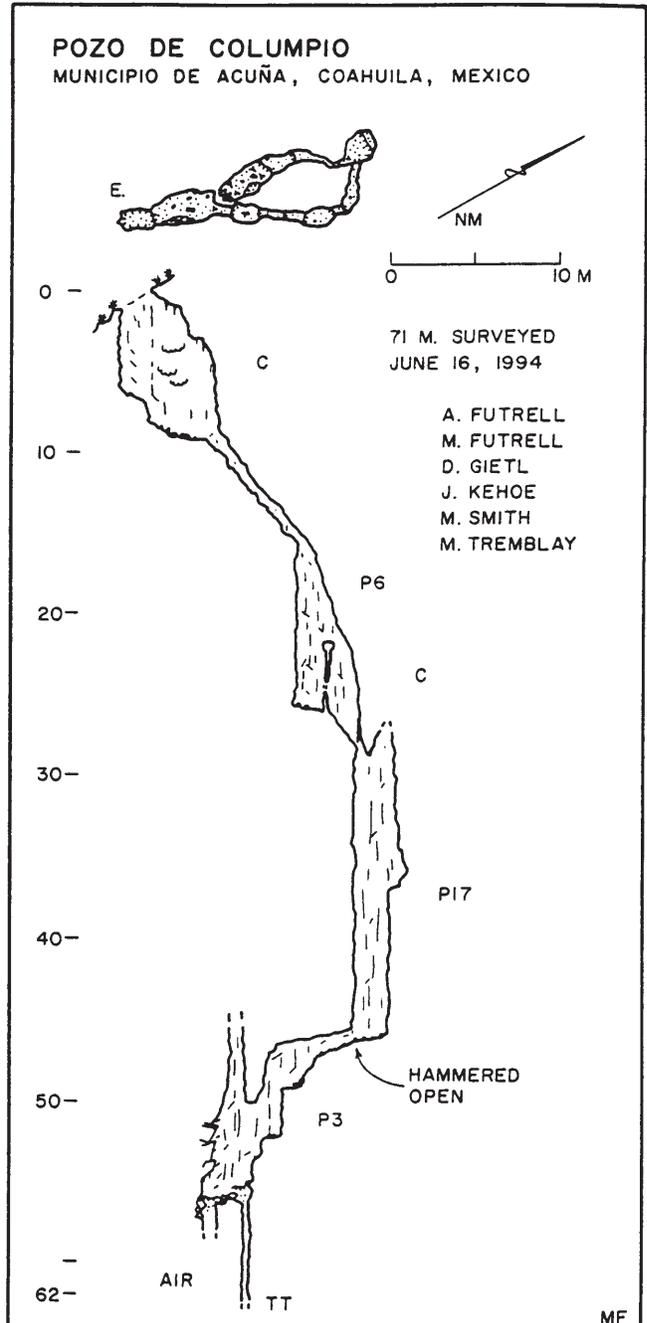
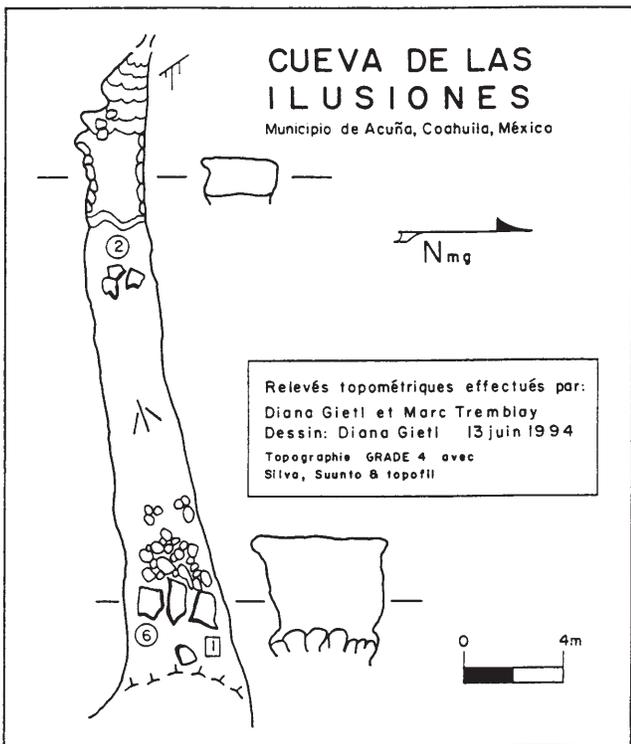
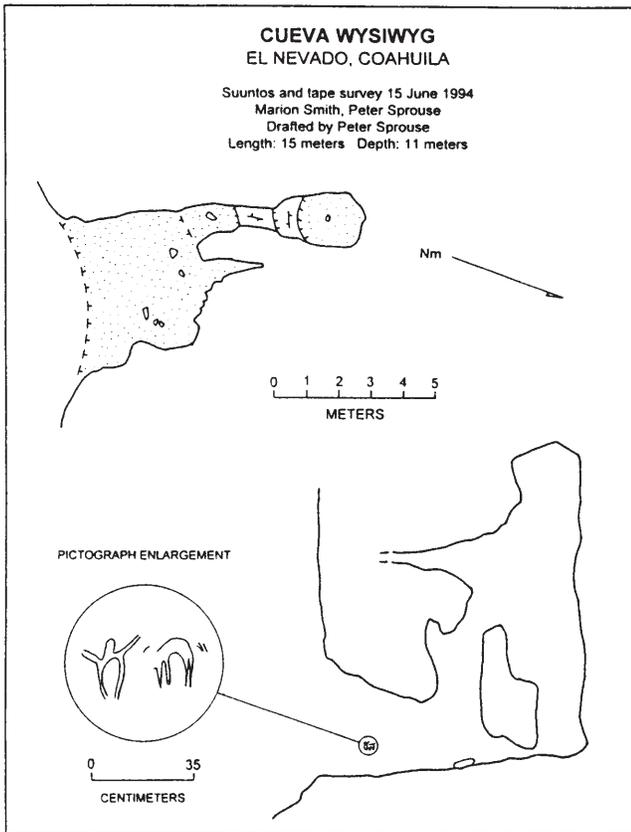
couldn't remember exactly where it was. We encouraged him to try, so we set about combing the hillsides north of El Nevado. It took a while, but eventually he found it by noticing a sotol whipped by the breeze. As we approached, we could hear the wind coming from the earth. No opening was visible, but after removing a joshua tree we could see cracks around a boulder. Even Benito became excited as we cleared loose rocks and dirt. When we got to bedrock, we found a hole

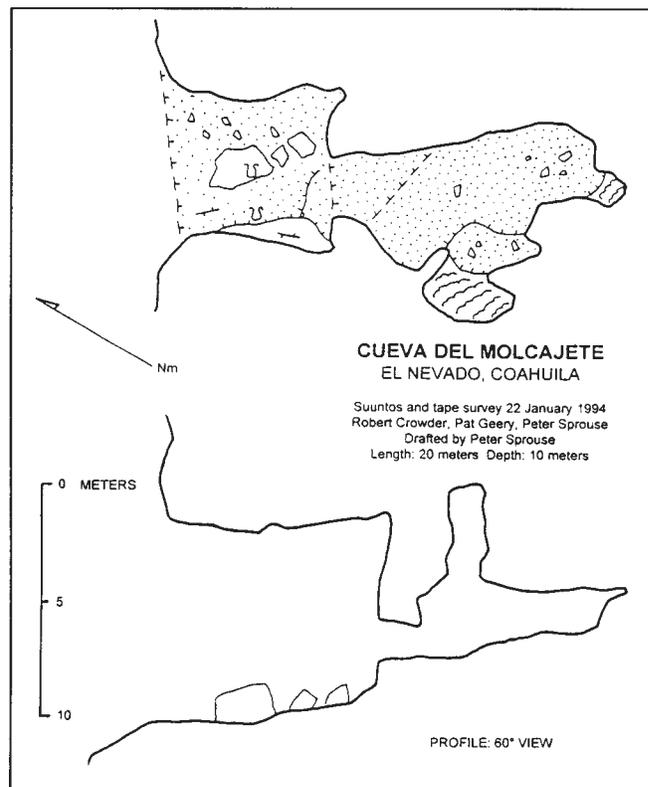
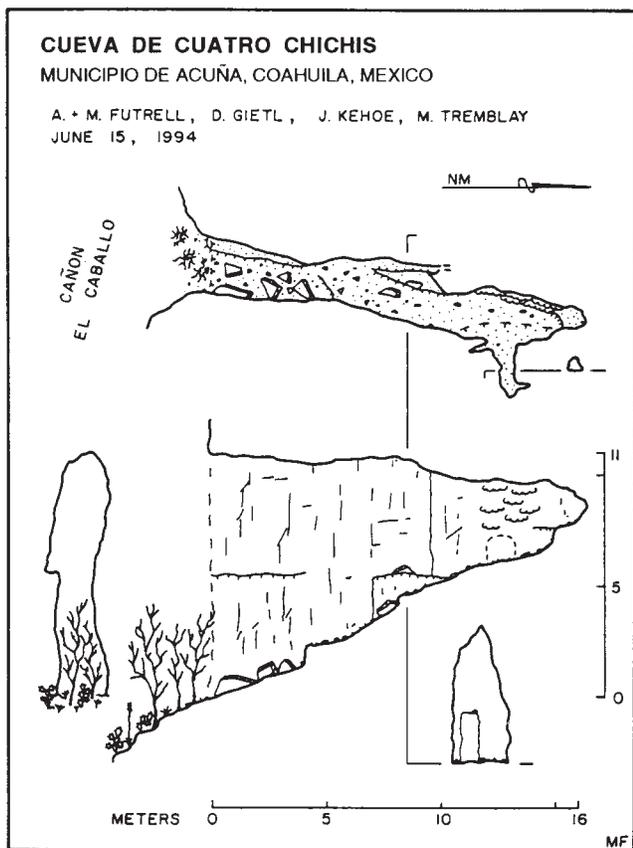
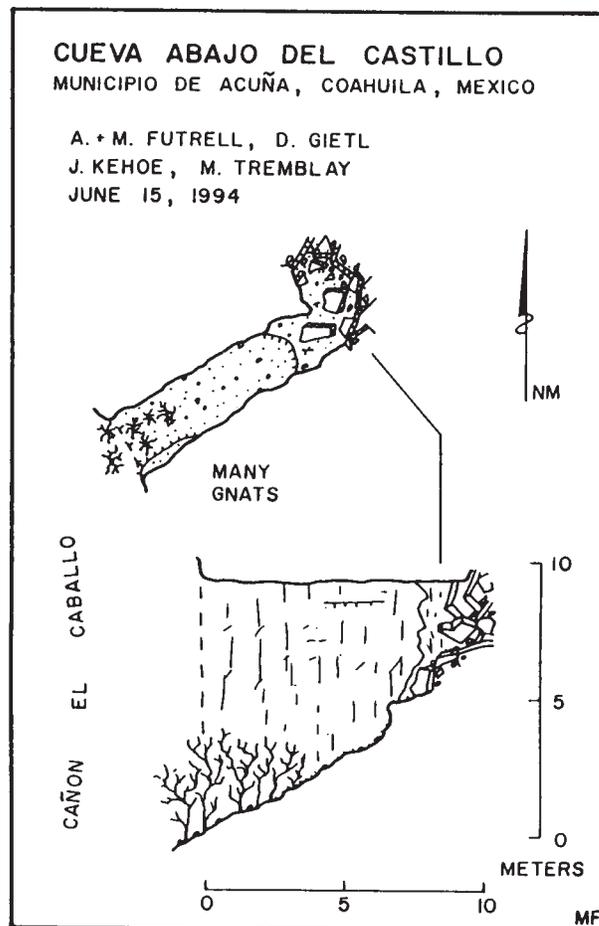
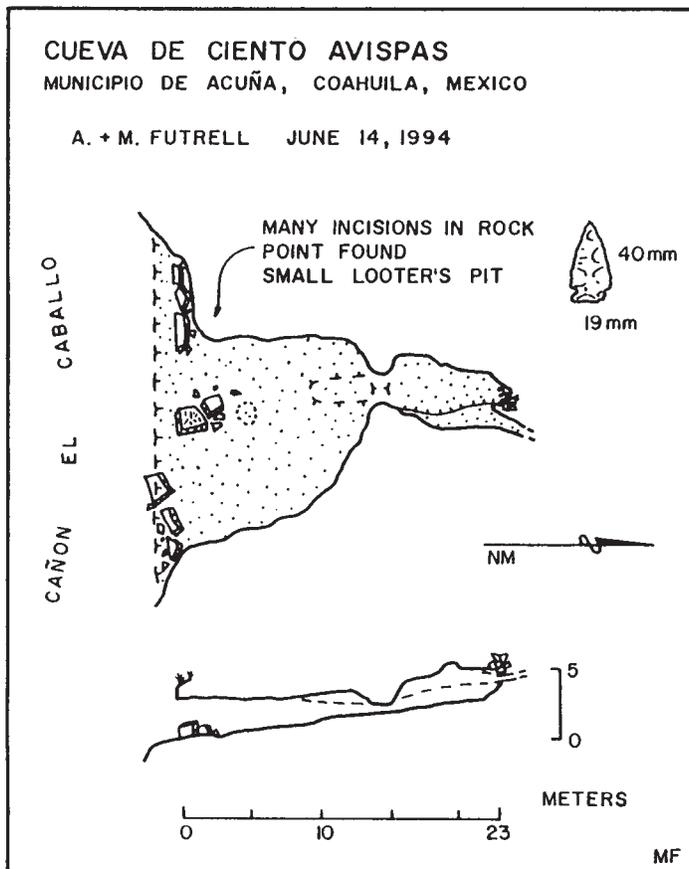
about 15 centimeters in diameter that seemed to go horizontally into the hillside. The wind was too strong to look into with unprotected eyes, and glasses immediately fogged. Obviously some major bedrock removal would be required to get into this cave.

We headed down the mountain to meet the rancher, who wanted to show us some entrances in Cañon el Caballo, at the base of the range. We followed his truck through the foggy canyon, where some of the



Nevada area, near the Blowhole. Peter Sprouse.





leads he showed us were shrouded in mist. We hiked up to one cave that we mapped, Cueva el Retiro. It went into a short crawlway with a floor of deep dust. The road back to Acuña was a bit better, though still quite muddy. The windshield of the Trooper retained many scratches from the mud-wiping episode.

Since my goal at this point was to gather leads for the pre-convention field camp, we set out to do one more trip to try to open up the blowing hole. Seven of us left Austin the evening of 17 February 1994 in David McKenzie's Suburban "Simba": David, Robert Crowder, Pat Geery, Jody Horton, Mark Blaze, Paul Reavely, and me. We stopped to see the rancher in Acuña, then drove the rest of the way on to Rancho el Nevado, arrived at the gate at 5:30 A.M., and set up tents for a bit of sleep.

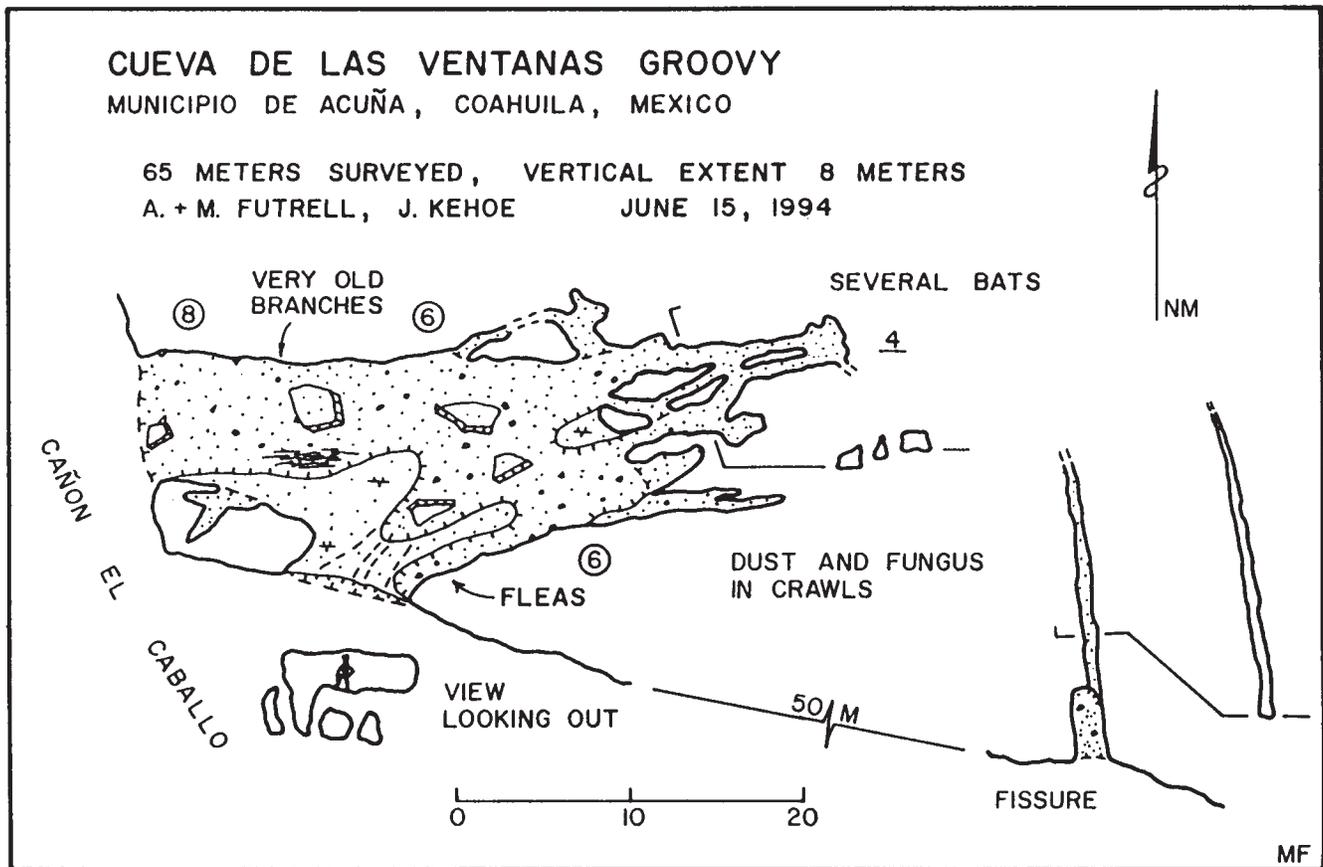
We arose at 9:00 and gathered up tools for our dig. Benito arrived and took the first wave down to our blowing-hole lead. Pat uncovered

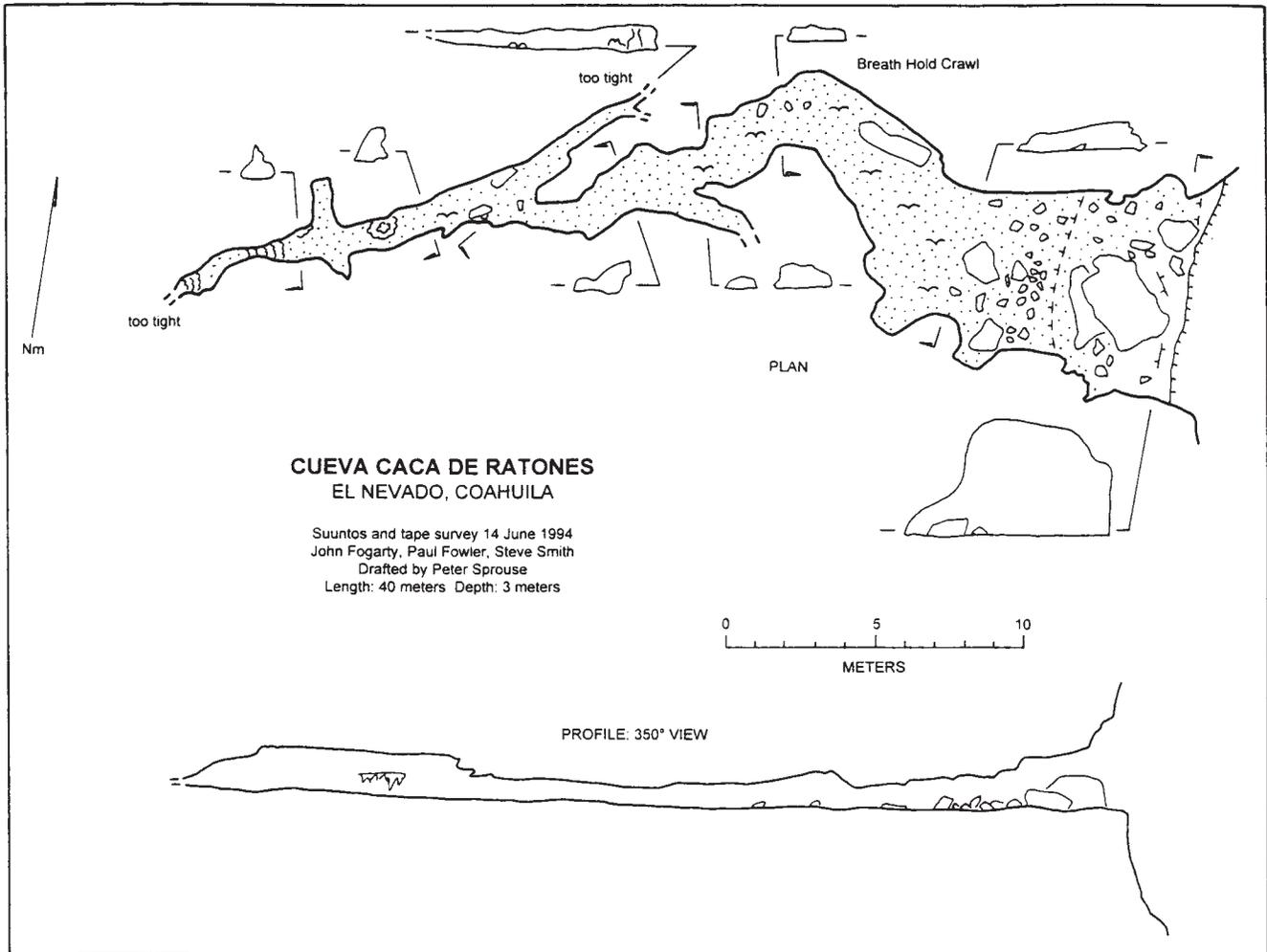
a hole about 1.5 meters up-slope from the blowhole that came close to connecting, so we set the first two-stick charge there. At first it seemed to have been ineffective, but it had blown a small connection into the cave. After some enlargement, we jammed two more sticks into it, enlarging it some more. By then, the roof was fractured enough that persistent hammering gained us an entrance to a crawlway. The next several charges took out bits of false floor, giving steady progress. Robert, Jody, and Mark did the seventh blast that evening, and came back reporting that there was a lot more work to do.

The next day we decided to leave the dig for awhile and drive off to the southwest to look for two caves on Rancho el Dos that Benito's friend Ricardo had told him about. Unfortunately, Ricardo could not be located, but we decided to go anyway. The drive was about twenty-two winding miles to the southwest, and it took three hours. We were below a high anticlinal

ridge, at the base of which there was supposed to be another blowing hole. Also, a pit into which rocks fell a long way was reported to be nearby. We split into two teams to ridgewalk, but failed to find either entrance. The area did look good, so we vowed to return with the proper guide. On the way back, we checked in with a fellow named Cosme at ejido Mariano Escobedo. We got back to camp well after dark.

The following day, Pat and I went into the crawl in the blowhole and moved large amounts of material out. Then I moved up to set the eighth charge. The low bedding plane continued ahead, while a more promising sloping bedrock slot dropped down into an open lower level. Both were taking air. A small crack in the ceiling on the right was perfect for stuffing in a Ziploc bag. I jammed four sticks' worth into it, and it worked spectacularly. Mark went in and crawled right through. Fifteen meters of open crawl led to a low bellycrawl with an easily diggable floor. Although the wind was still at the





time, it began to pick up enough that we could tell we had the way on. But it was time to go, so we stashed some supplies and left it for the next trip. We bathed at Pila el Nevado and headed down the mountain and on into Acuña. We dined at Crosby's and reached Austin about 1:00 A.M.

For the pre-convention field camp, I had registered as many people as wanted to go, which fortuitously was about the number I thought we could handle. Signed up were Don Bittle, Kay Bittle, Teaka Dearing, Judy Fisher, John Fogarty, Paul Fowler, Andrea Futrell, Mike Futrell, Diana Gietl, Peter Grant, Pete Hollings, Jody Horton, Jack Kehoe, Paul Mozal, Ray Nance, Marion Smith, Steve Smith, Steve Taylor, Mark Tremblay, Brian Watkins, and I. We rendezvoused the weekend before the con-

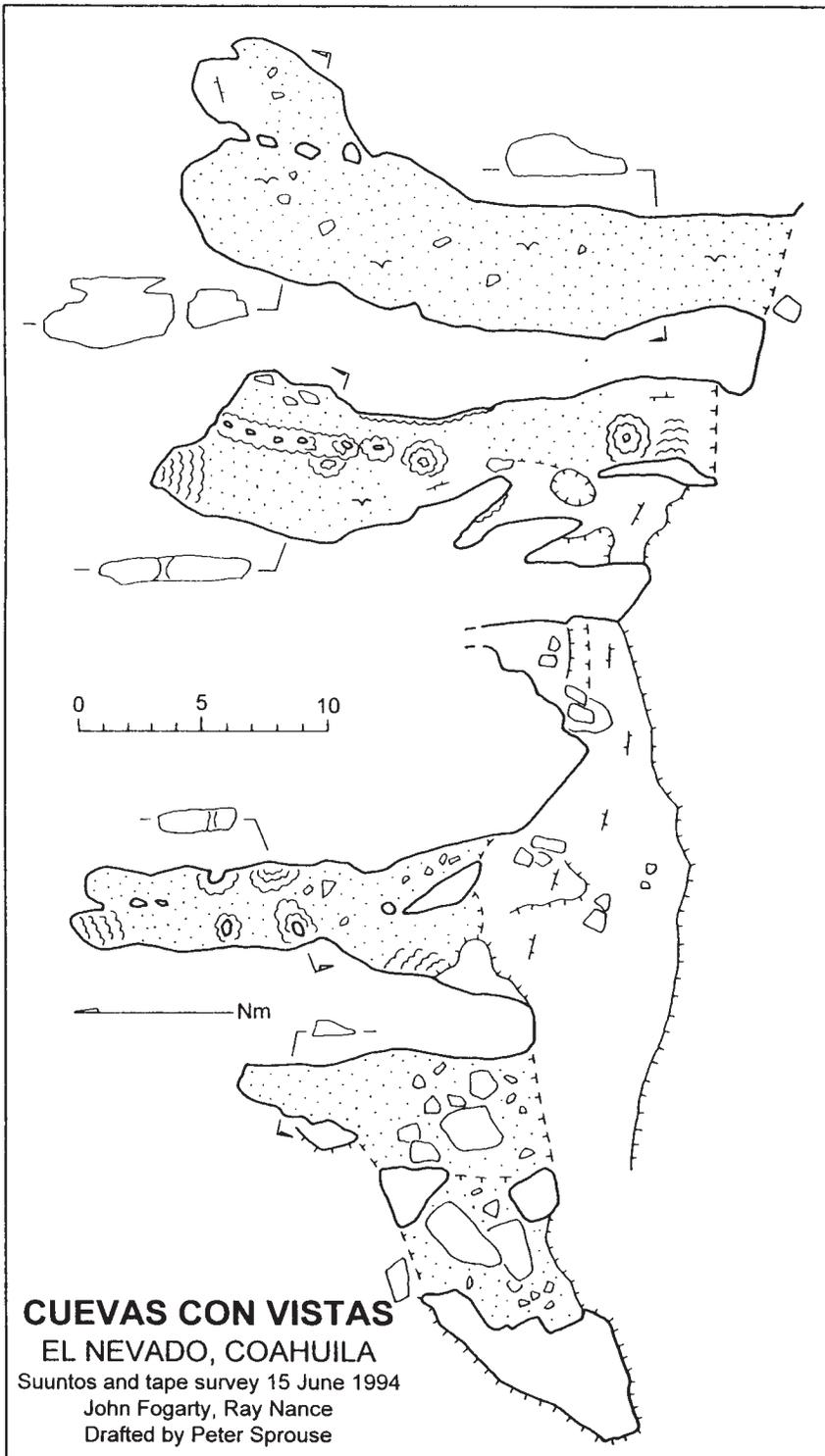
vention at Fort Clark Springs, the convention site in Brackettville, and left a few extraneous vehicles there, before setting out the next day. The trip out the desert road was pretty much trouble-free, aside from one flat tire and a points adjustment in my Power Wagon bus, which was making its first Mexico trip in seventeen years. We set camp next to a large steel water tank, which would supply us with plenty of water for the week. What followed was a flurry of activity, with cavers ranging widely over the area, hunting and exploring caves. Unfortunately, I wasn't involved in much of it, since I came down with a mysterious illness that afflicted me until after the convention. It turned out to be an obscure disease called relapsing fever, caused by a tick bite I'd received the week before in an Austin cave.

Down in the blowhole, there

were several more digging trips, which extended the cave to about 35 meters in length. At that point it was sloping down, still blowing, with rocks blocking the way. It has not been visited since, nor has it been surveyed.

Between camp and El Nevado, we found a new pit called Pozo de la Escalera Cristal that went down three drops, with several well-decorated chambers containing numerous paleontological remains. Don Bittle and Steve Taylor have written good accounts of this cave in the summer 1994 issue of the *Crawlway Courier*, newsletter of the Little Egypt Grotto. This cave is 200 meters long and 64 meters deep.

Mike and Jack led a number of trips down to Cañon el Caballo at the base of the mountain, where quite a few caves were explored. None was of much extent. The rancher did show up to take Mike



and crew up onto a ridge east of there to a nice pit called Pozo de Columpio. This went down a series of drops to a depth of 62 meters.

Several caves were explored in the canyons west of El Nevado, as well. One of these was a large, square opening that could be seen from our hilltop camp several kilometers away. This cave and several others in the western canyons, including Cueva de las Ilusiones, were mapped by Marc Tremblay and others. At the end of the week, we packed up camp and headed back toward Acuña. Not far from town, our caravan of vehicles passed a strange-looking naked man by the roadside. A minute later Jody's truck came to a screeching halt with a locked-up rear end. With only an hour or two of work, he had it back together again. Had the odd-looking brujo back up the road cast a curse on us? This theory gained credence later, when we reached the convention site and heard the Bittles' tale. Don, who was at the head of the caravan, had soon tired of waiting for Jody's truck to be repaired. After picking up a cow skull from the roadside, he went on across the border. Halfway to Brackettville, a scorpion crawled out of the skull and stung Kay on the finger. They spent the next day or so running back and forth to a doctor.

I still had a number of leads left to follow up after the dust of the NSS Convention settled. One of these was from a Del Rio school principal who had called up the convention committee to see if we would come explore his pit in northwest Coahuila. We made arrangements to do that in January 1995, when Pat Geery, Jody Horton, Susie Lasko, and I met the rancher in Del Rio. We rode out to the ranch in his pickup, and it was a very long trip across the desert. Rancho la Pirámide was a lot farther out the desert road than we had been, and we arrived very late that night.

The next day we all hiked up a nearby ridge to the pit. It was a very nice entrance indeed. Smooth bedrock sloped into a pit that seemed reasonably deep. Although

broken by a reblay at a ledge half-way down, it was really a 61-meter drop. I didn't quite get to the bottom before running out of rope, so I spent half an hour or so waiting for more and staring into a huge borehole I couldn't quite reach. Soon we were down and exploring through the new borehole. This was big passage, 20 to 30 meters in diameter and 100 meters long. Big breakdown blocks were nearly buried in deep dust into which we sank up to our thighs. This place was very dry, drier than the desert above, sinking the rancher's hopes for a new water source. A few mummified buzzards seemed to emphasize this point.

Rather than take the long, rough road back to Acuña, we decided to leave Mexico at La Linda and drive the highways back to Del Rio, a longer but better route. Since the rancher's brother appeared to be having a heart attack, this seemed the prudent thing to do.

There are still many things to do in the northern desert. We still have reports of leads to follow up on, and of course the digging needs to resume in the blowhole sometime. I'm sure that after a few trips of tropical rain I'll be ready to venture out the dusty roads once again.

Cave Descriptions

Pozo Sin Osos

Rancho el Nevado, Coahuila

Depth 12 meters

UTM coord. E 790,625 N 3,239,670

This pit is located 1800 meters north of Cerro el Nevado at an elevation of 1158 meters. It is a small, blind bedrock pit about 12 meters deep on the north side of a drainage. Pozo Sin Osos was located in January 1994 and explored in June 1994.

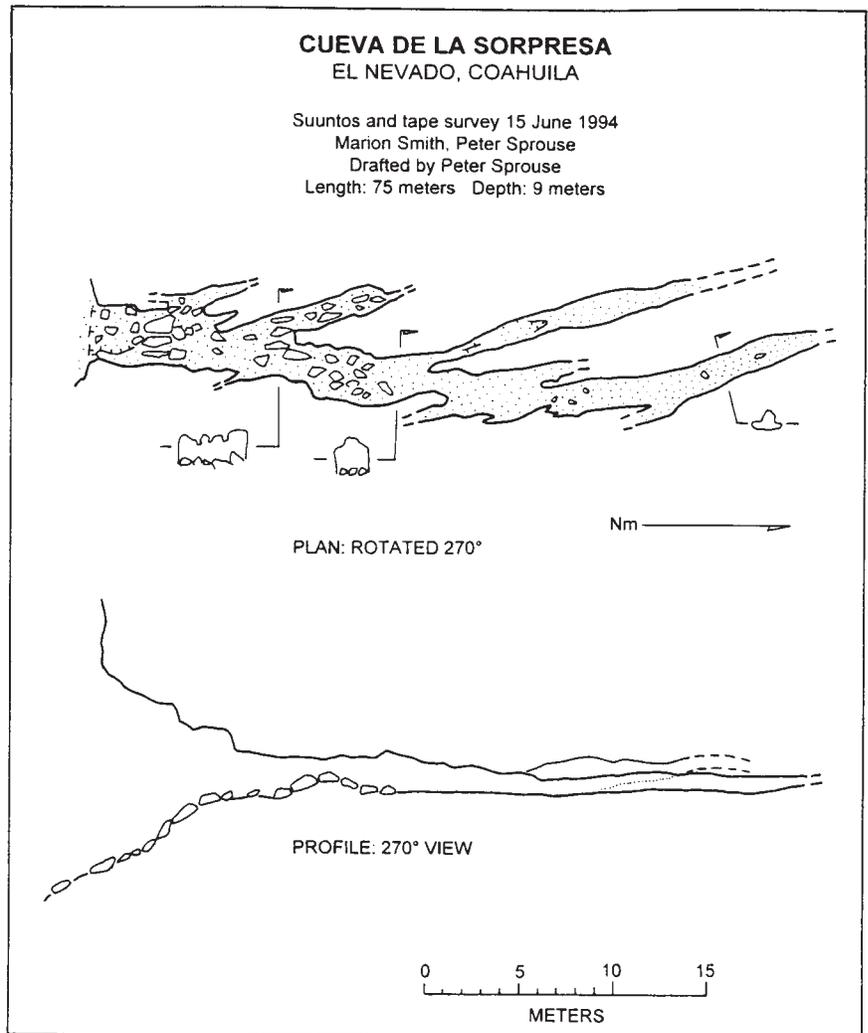
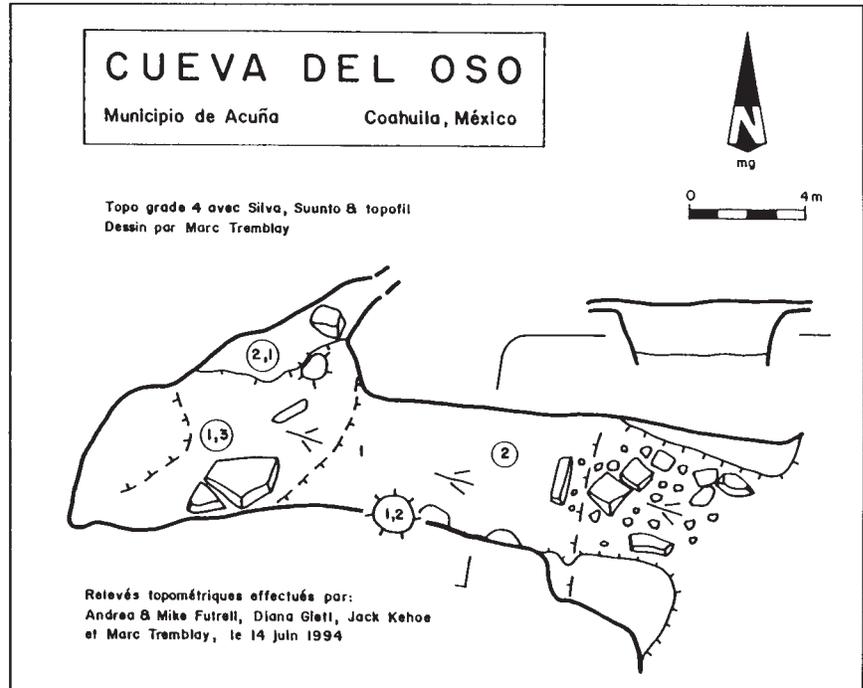
Cueva de las Avispas

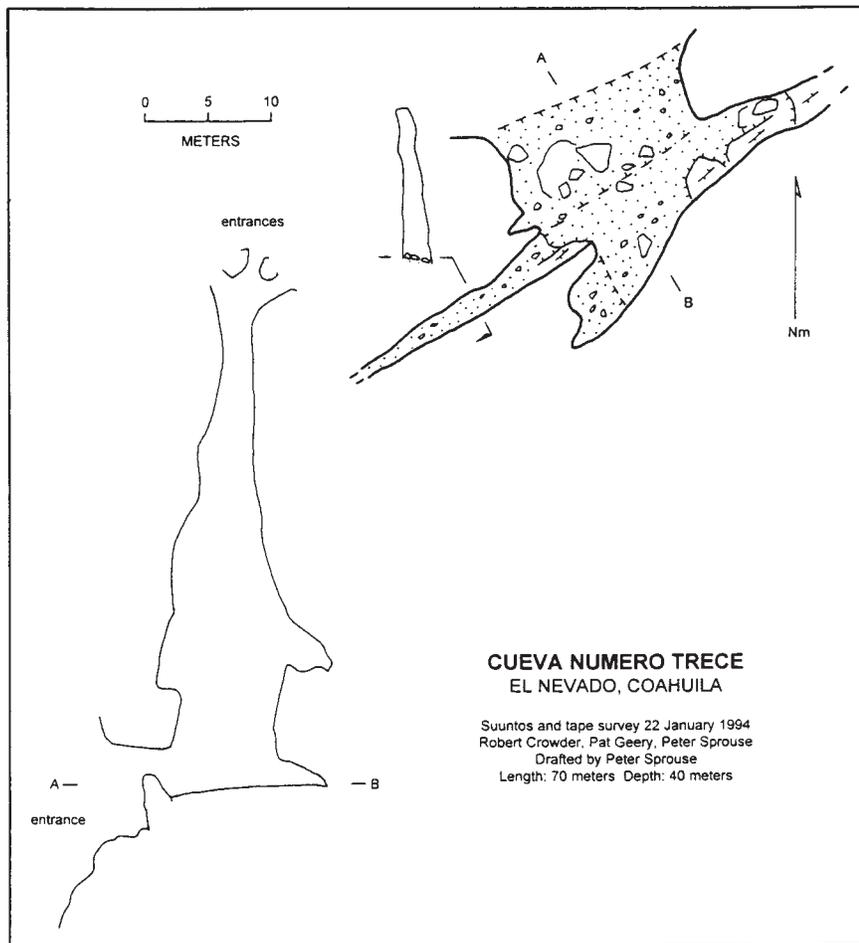
El Nevado, Coahuila

Length 9 meters, depth 1.5 meters

UTM coord. E 783,150 N 3,238,740

This cave is situated on the east side of Cañon el Bloque 7500 meters west-northwest of Cerro el Nevado, at an elevation of 1040 meters. It is in a south-facing cliff. The entrance





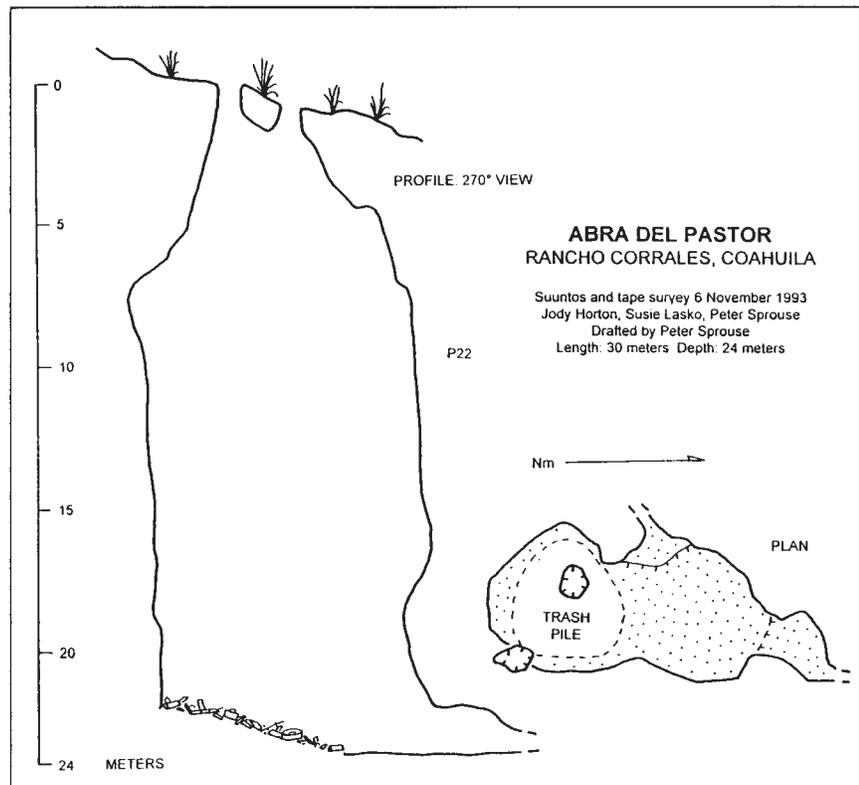
is 1.5 meters high and 1 meter wide, narrowing to a low crawl. It gets too low in a flowstone pinch. It was explored by John Fogarty and Ray Nance in June 1994.

Cuevas Con Vistas
El Nevado, Coahuila
UTM coord. E 784,755 N 3,327,100

This is a cluster of five caves on the east side of Cañon Botella, 6000 meters west of Cerro el Nevado. They are in the canyon wall 40 meters up a slope at 1135 meters elevation, and they have the appearance of cliff dwellings. Two of these go through a rock outcrop. These caves were explored and mapped in June 1994 by John Fogarty and Ray Nance.

Cueva de Caca de Raton
El Nevado, Coahuila
Length 40 meters, depth 3 meters
UTM coord. E 210,525 N 3,241,690

This cave is located about 6200 meters northeast of Cerro el Nevado along the east side of Cañon el Caballo. The entrance is at 1000 meters elevation and leads into a horizontal passage that gradually diminishes until it becomes too tight. The floor is covered with fine dust and rat feces. It was explored by John Fogarty, Steve Smith, and Paul Fowler on 14 June 1994.



Cueva el Retiro
El Nevado, Coahuila
Length 22 meters, depth 6 meters
UTM coord. E 210,820, N 3,240,420

This cave is located in the east wall of Cañon el Caballo, 5700 meters northeast of Cerro el Nevado. It is situated where the talus slope meets the base of the canyon wall at 1010 meters elevation. A short climb inside the entrance leads to a crawl floored with deep dust. This one was explored by Robert Crowder, Pat Geery, and Peter Sprouse on 23 January 1994.

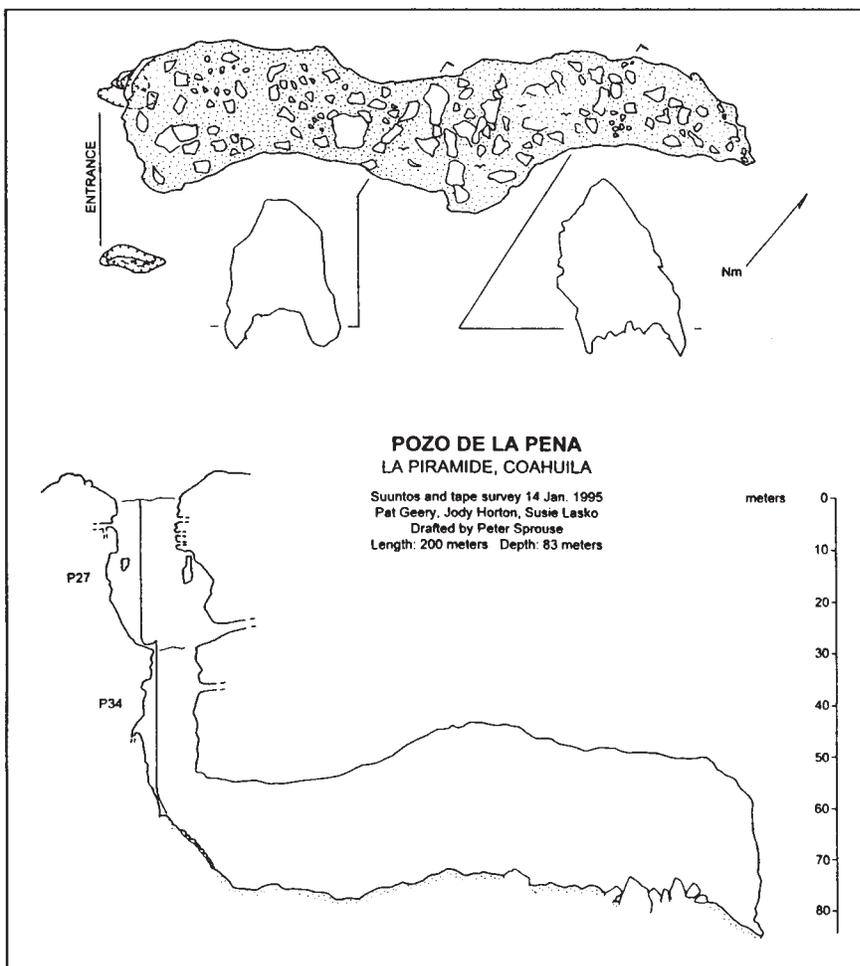
Abra del Pastor
Rancho Corrales, Coahuila
Length 30 meters, depth 22 meters
UTM coord. E 212,320 N 3,252,810

This pit is located 650 meters southwest of Rancho Corrales at 825 meters elevation. This ranch, which is not marked on the topo map, is about 14 kilometers west of Chupadero del Caballo. The entrance is located in a cove partway up a hill and opens into a 20-meter pit. The floor is covered with trash dumped in by the ranchers. This pit was explored by Jody Horton and Peter Sprouse on 6 November 1993.

Pozo de la Escalera Cristal
Rancho de Nevado, Coahuila
Length 200 meters, depth 64 meters
UTM coord. E790,650 N 2,239,620

This pit is located 1700 meters north of Cerro el Nevado at 1158 meters elevation. It is about 100 meters east of the road to the Nevado ranch-hand's house, very close to Pozo Sin Osos. This is a well-decorated cave consisting of various levels connected by pits. The 25-meter entrance pit lands in a large chamber with human and animal remains. At the south end

Diana Geitl mapping in Cueva de las Ilusiones. *Marc Tremblay.*



of this room is a blind 7-meter pit, while the north end has a 12-meter pit down to the next level. A dig at that point opened up a 15-meter drop to the lowest level. Many cavers on the pre-convention camp participated in the exploration and survey of this fine cave.

Cueva Número Trece
El Nevado, Coahuila
Length 70 meters, depth 40 meters
UTM coord. E 785,700 N 3,239,470

This cave is located 10.5 kilometers east-southeast of Mariano Escobedo at an elevation of 1070 meters. It is on the east side of Cañon Número Trece, about 1500 meters upstream of

its confluence with Cañon el Bloque. This cave is formed by tectonic slumping of a block of the canyon wall. Just inside the entrance, a high skylight can be seen about 40 meters up. This cave was checked on 22 January 1994 by Robert Crowder, Pat Geery, and Peter Sprouse.

Cueva del Molcajete
El Nevado, Coahuila
Length 20 meters, depth 6 meters
UTM coord. E 785,700 N 3,329,420

This cave is situated 10.5 kilometers east-southeast of Mariano Escobedo at 1000 meters elevation. It is just south of Cueva Número Trece in the same cliff face. A short formation passage leads off the entrance chamber. A bedrock *molcajete* (mortar) and smoked ceiling indicate this site was inhabited. Robert Crowder, Pat Geery, and Peter Sprouse explored this cave on 22 January 1994.

Cueva Abajo del Castillo

El Nevado, Coahuila

Length 13 meters, depth 9 meters
UTM coord. E210,875 N 3,245,635

This cave is located 8500 meters north-northeast of Cerro el Nevado, at an elevation of 950 meters. It is on the west side of Cañon el Caballo. The cave consists of a short passage sloping up to a collapse. It was explored on 15 June 1994 by Andrea and Mike Futrell, Diana Gietl, Jack Kehoe, and Marc Tremblay.

Cueva de Cuatro Chichis

El Nevado, Coahuila

Length 20 meters, depth 11 meters
UTM coord. E 210,620 N 3,245,545

This cave is located 8500 meters north-northeast of Cerro el Nevado. It is on the west side of Cañon el Caballo at 980 meters elevation. This is basically a single passage that slopes up to a flowstone terminus. It was explored on 15 June 1994 by Andrea and Mike Futrell, Diana Gietl, Jack Kehoe, and Marc Tremblay.

Cueva de las Ventanas Groovy

El Nevado, Coahuila

Length 66 meters, depth 8 meters
UTM coord. E 211,135 N 3,344,445

This cave is situated 7500 meters northeast of Cerro el Nevado on the east side of Cañon el Caballo. The two entrances are at an elevation of 960 meters. It is dusty and has a small crawlway maze in the back. This cave was mapped on 15 June 1994 by Andrea Futrell, Mike Futrell, and Jack Kehoe.

Cueva del Oso

El Nevado, Coahuila

Length 15 meters, depth 2 meters
UTM coord. E 209,960 N 3,244,835

Cueva del Oso is located on the west side of Cañon el Oso, 10 kilometers northeast of Cerro el Nevado. It is at an elevation of 960 meters and consists of a linear passage that jogs to the left before ending. It was explored on June 1994 by Andrea Futrell, Mike Futrell, Diana Gietl, Jack Kehoe, and Marc Tremblay.

Cueva de Ciento Avispas

El Nevado, Coahuila

Length 23 meters, depth 5 meters
UTM coord. E 212,645 N 3,248,640

Cueva de Ciento Avispas is located 4600 meters south of Rancho Corrales, at 890 meters elevation. It is in the west cliff wall of Cañon el Caballo. It has a wide shelter-like entrance that narrows to a pinch in the back. Some archaeological remains as well as looter's pits were noted by explorers Andrea and Mike Futrell.

Pozo de Columpio

El Nevado, Coahuila

Length 100 meters, depth 62 meters
UTM coord. E 214,440 N 3,244,700

Pozo de Columpio is located 9800 meters northeast of Cerro el Viejo at 990 meters elevation. It consists of a number of rope drops and climbs. The entrance is a 7-meter climbdown, followed by a slope to a 6-meter pitch. A short climb then leads to a 17-meter drop. A 3-meter drop leads down to a rift that is too narrow to pursue. This cave was explored on 16 June 1994 by the Futrells, Diana Gietl, Jack Kehoe, Marion Smith, and Marc Tremblay.

Cueva de la Sorpresa

El Nevado, Coahuila

Length 15 meters, depth 11 meters
UTM coord. E 784,790 N 3,236,985

This cave is located 5900 meters west-southwest of Cerro el Nevado. It is on the east side of Cañon Botella at 1110 meters elevation. The cave has several Y-junctions, and all routes pinch. It was mapped on 15 June 1994 by Marion Smith and Peter Sprouse.

Cueva WYSIWYG

El Nevado, Coahuila

Length 15 meters, depth 11 meters
UTM coord. E 783,105 N 3,238,740

Cueva WYSIWYG is located on the east side of Cañon el Bloque 7500 meters west-northwest of Cerro el Nevado. It is at the base of the cliff-wall at 1040 meters elevation. Just inside the entrance on the left wall are some pictographs. Beyond, the cave extends up a climb to a blind dome pit. It was explored on 15 June 1994 by Marion Smith and Peter Sprouse.

Pozo de la Peña

Rancho la Pirámide, Coahuila

Length 200 meters, depth 83 meters
UTM coord. E 746,895 N 3,279,380

This pit is located 3500 meters northeast of Rancho la Pirámide at 885 meters elevation. It is near the top of a ridge. A bedrock sink slopes into a pit 5 by 10 meters across. About 5 meters down is a major ledge, but rigging on the north side avoids that, for a 27-meter drop. This lands at the base of a slope where the shaft continues down for another 34 meters. This pitch ends at the top of a talus slope leading down into a large borehole. This passage is 20 to 30 meters in diameter and 100 meters long. It is floored with breakdown that is covered with deep dust. Pozo de Peña was explored on 14 January 1995 by Pat Geery, Jody Horton, Susie Lasko, and Peter Sprouse.

Exploración de cuevas en el norte de Coahuila

Muchas cuevas chicas se han descubierto y explorado en las montañas secas del norte de Coahuila.

THE CUEVA DE SANTA CRUZ EXPEDITION HUAUTLA DE JIMÉMEZ, OAXACA

James Smith

The goal of the three-week-long expedition was to revisit Cueva de Santa Cruz, determine if the original explorers had completed the exploration, and, if not, continue where they had stopped. Also, we planned to search the high karst near Agua de Cerro, recheck Nanta Ridge, and look for new cave entrances that might connect into Sistema Huautla. The personnel initially were James and Laura Smith from Georgia and Ron Simmons from Virginia. We were joined by Matt Oliphant, Nancy Pistole, and Carol Vesely from California, Rick Fritschler and Karlin Meyers from New York, and Yvo Windemere from Switzerland. These cavers either joined us for a week of caving on their way to Cerro Rabón or were on their way home from the recently concluded Cueva Cheve expedition. The caver population of San Agustín also included members of Bill Stone's Sótano de San Agustín expedition [see *AMCS Activities Newsletter* 21].

Laura, Ron, and I arrived in Huautla de Jiménez on February 19, 1994. We rented two rooms in the Posada San Antonio for the night. The next day we caught the bus to San Agustín and rented a field house from Felipa. We had expected Stone and crew to be in San Agustín when we arrived, and we had bought into his food plan, paid by the day. Since his expedition had not yet arrived, we improvised. Fortunately, we had prepared for a cave camp and brought stoves.

On February 21, we caught a truck to San Andrés, and then we walked down a 2.5-kilometer-long trail toward Santa Cruz. None of the Huautla Project cavers had ever

been to the cave, so we had to locate it from a rough 1972 description. Canadian cavers had been the original explorers and surveyors of Cueva de Santa Cruz. We had high hopes that their exploration was incomplete, since the descriptions of their work were sketchy at best. We hoped that this cave could be the missing link into the lower reaches of the Sistema Huautla drainage. There were at least 5 kilometers of overland distance between the -1353 sump in Sistema Huautla, the end of that cave before Stone's 1994 work, and the end of Cueva de Peña Colorada, a wet-weather resurgence for the area.

Near the community of Santa Cruz, we hiked up a karst valley that is actually a line of large dolines between Nanta Ridge and Agua de Cerro. The vertical difference between the Plan de Escoba dolina and Santa Cruz is 400 meters. We climbed only a couple of hundred meters and looked for entrances in the floors and walls of dolines. The local farmers said there were no caves. They are notorious for their lack of cooperation, but we did not find any entrances. However, we did find at least six entrances on the way to Santa Cruz, in the San Andrés karst valley. By the end of the day we had located Cueva de Santa Cruz.

Cueva de Santa Cruz is in a limestone headwall and receives a sinking stream that flows across the bottom of the Santa Cruz dolina. The stream originates from springs in non-carbonate rocks adjacent to the limestone. The spectacular entrance is Oztotl-shaped, with a height of 25 meters and a width of

13 meters. There was a strong smell of bird and bat guano emanating from the twilight zone. We went into the cave to the first drop. On the way to the first drop, we had to walk through a 2-meter-diameter dark red spot that upon closer inspection was pulsing with life. We were below a vampire-bat roost. We heard a loud noise coming from the entrance and dashed back to our packs, but there were no locals at the entrance, and the noise is still a mystery. Perhaps we had disturbed the vampires and heard the sound of wings high above us. We stashed our caving gear and ropes in a side passage, since it was late in the day. Then we did a cursory check of some of the entrances we had seen on the way to Santa Cruz, Di Nita Nanta (Water Cave, 50 meters long), De Nita Nanta Li (Light Water Cave, 30 meters long), and Sótano de Ron Rico, a pit estimated to be 10 meters deep. The hike to the field house in San Agustín was about 8 kilometers, with a climb up almost 350 meters to San Andrés and a drop of 250 meters to San Agustín. This round trip of 16 kilometers each day would certainly add an element of sport to our caving adventures.

The next day, Ron, Laura, and I were back at Santa Cruz. Laura decided to watch our gear inside the entrance, since the whole town turned out to watch us enter the cave. Ron and I left Laura to feed the vampires, and we climbed up and over a small breakdown pile into the 25-meter-high canyon. Swifts may roost high in this canyon, as we saw birds in the entrance area, and birds twice flew at Laura's headlight. We each carried

nine ropes into the cave. We descended a few short climbs to the first pit. I set two 8-millimeter bolts at the top of the 4-meter pit. The pit is located just beyond the vampire-guano pool, about 130 meters from the entrance. Below the pit, Ron and I followed about 30 meters of 1.5-meter-wide canyon and again encountered the stream, which had disappeared in a sump inside the entrance. We saw no vampire-guano pools in this part of the cave. Shortly after reaching the stream, we found the next drop, a possible climb of 5 meters. This was the Canadian's Storm Pot. But bat droppings made the climb too slippery, so I set a bolt that kept the rope off the slimy walls. The drop ends in a deep pool where swimming can be avoided by hanging onto the walls.

Fifteen meters down the passage, we encountered a 5-meter pit that required getting off rope into water over our heads 10 meters from shore. There was no longer any point in avoiding swimming, but we tried to keep water out of our mouths. Immediately beyond the swim, we encountered an 8-meter drop, and two more drops, of 8 and 15 meters, in the next 150 meters of canyon also had swims at the bottom of the rope. The 15-meter drop was down the side of a large flowstone mass that had a deep and narrow flume cut into its wall. We rigged down the middle of the flume, and water was channeled

directly into the climber's face. It took a fancy pendulum to reach a dry ledge and avoid the swim. This cave reminded me of El Chorrero in Chiapas. Ron struggled with swimming while carrying a large bundle of rope and his heavy camera gear. He remarked that he is negatively buoyant anyway, and I stood by vigilantly to rescue the ropes if he sank. The canyon continued, with numerous wading pools and small climbs. In some areas, the passage had filled with flowstone that had then dissolved, giving the appearance of glass-smooth onyx. This was a truly gorgeous cave. But a thin slime of microscopic organisms coated the floor and walls, which made climbing downright dangerous and the otherwise easy cave treacherous to walk through. Consequently, we rigged a number of apparently easy climbs with handlines. Fortunately, we had many extra short ropes with us. Once we were beyond the bat and bird roosts, the cave was essentially free of mud and was clean-washed. We saw a little trash and an occasional hypodermic syringe wedged in cracks. We figured the slime was living on Santa Cruz's sewage, since the whole town drains into the cave. Needless to say, we didn't drink the water.

We reached the waterfall drop known as Del's Swing, which is a double pit. We noticed a 24-year-old nylon sling around a pendant

that had probably been used to redirect the rope across the first pit and down the second. The water disappears down the first pit into a narrow slot. The sling was in good condition, so I clipped a carabiner into it and used it in the rigging. It held. I rappelled 8 meters and intersected the waterfall where it emerged from the slot. A short, 3-meter drop, Will's Gallows, followed immediately.

From a high canyon, the character of the passage changed to 5 to 8 meters wide, with numerous climbs and an occasional crawl. The Canadians called this section of the cave The Slipway, and it lived up to its name. We set a bolt on a 5-meter climb and at the top of a 6-meter pit. Two more drops, of 5 and 6 meters, allowed us to penetrate to approximately 600 meters into the cave, at a depth of 130 meters. We stopped at a crawl that leads to a 2-meter drop through a cascade into a deep pool. It would later prove to be the most challenging drop in the cave to climb. We had rigged twelve ropes, and we left seven small handlines and ten bolts where we turned around. We didn't want Laura to have to sit in the vampire roost all night. Ron took a roll of film on the way out. We reached the entrance at 9:30 P.M. after an eight-hour trip. Laura had waited patiently. It took us two hours to hike back to San Agustín.

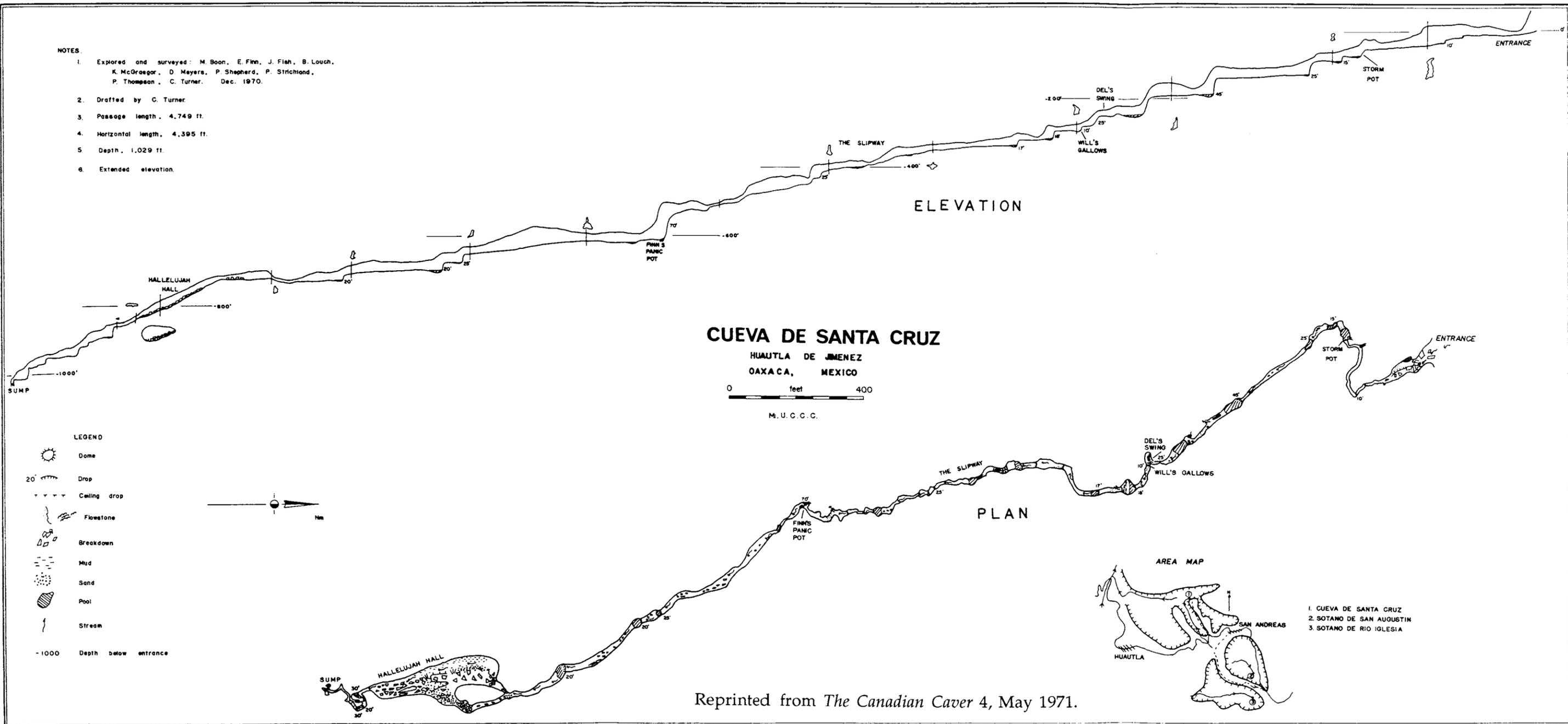
Ron and I did not enter Santa Cruz again until March 1, several days later, because there had been heavy rain, and we had to send Laura on her way back to the United States. We entered the cave with six fairly long ropes. Ron and I believed we had entered the cave unseen, even though the entrance is across from the school. It took only an hour to reach the end of our previous rigging. We rigged the cascade into the deep pool and two 6-meter pits, and we climbed down a 2-meter cascade. The passage became a belly-crawl to a slimy flowstone slope that could probably be

Carol Vesely getting off rope near the bottom of Santa Cruz.

Ron Simmons.



- NOTES
1. Explored and surveyed: M. Boon, E. Finn, J. Fish, B. Louch, K. McGraeger, D. Meyers, P. Shepherd, P. Strickland, P. Thompson, C. Turner. Dec. 1970.
 2. Drafted by C. Turner.
 3. Passage length, 4,749 ft.
 4. Horizontal length, 4,395 ft.
 5. Depth, 1,029 ft.
 6. Extended elevation.



Reprinted from *The Canadian Caver* 4, May 1971.

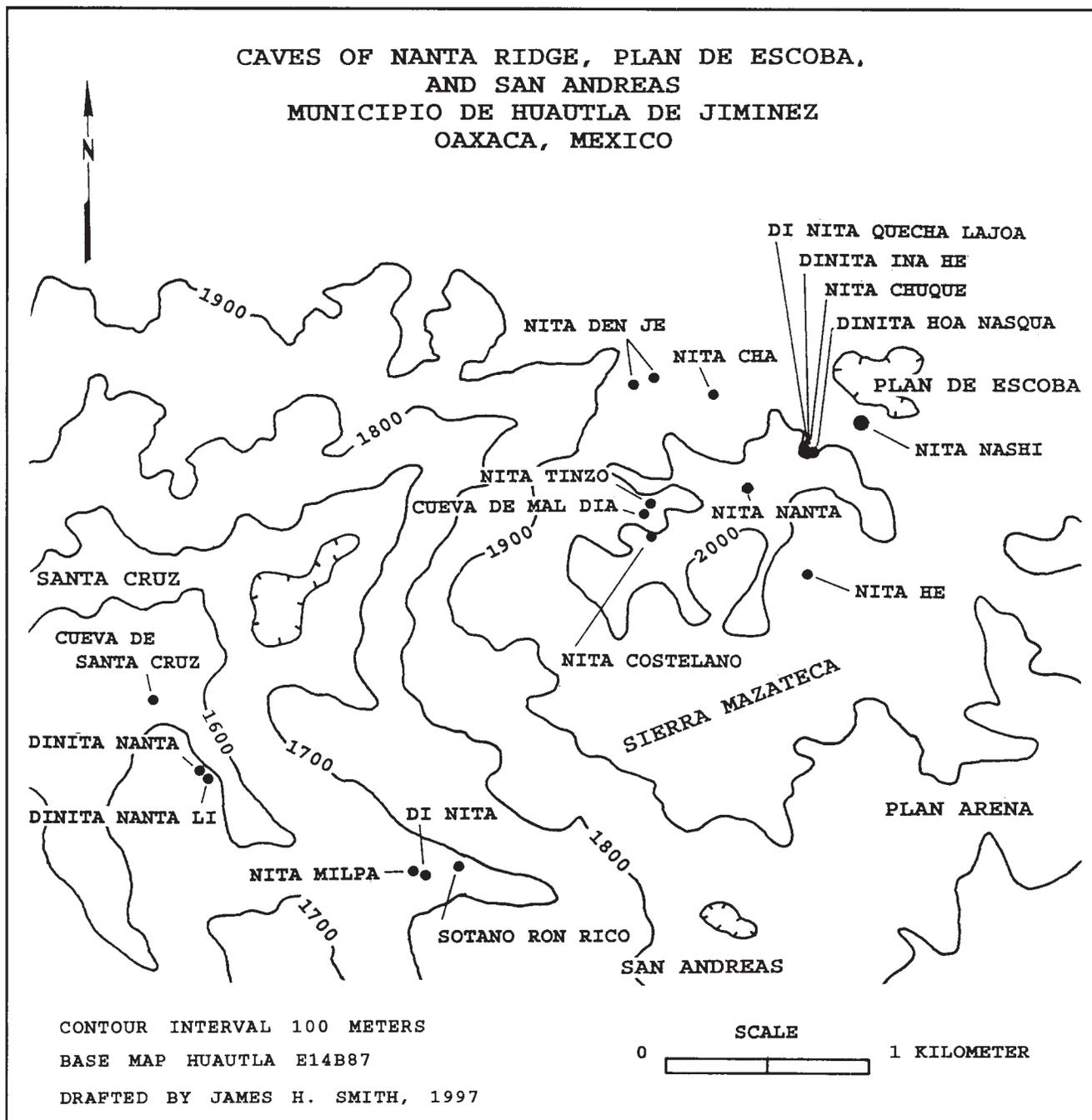
climbed up, but not without a few uncontrolled slides.

We encountered an 8-meter drop just before Finn's Panic Pot, a 23-meter pit. I set a bolt at the top of a 2-meter climb at the edge of the pit to ease getting on and off rope. The 23-meter pit is a sizable shaft 15 meters in diameter. We rappelled down the side of a large, steeply sloping flowstone wall into a pool. A climb up between the wall and massive flowstone led to an undercut 3-meter

drop. After this nuisance drop, we entered a large gallery strewn with breakdown. The passage is 20 meters by 10 meters, the largest passage seen up to this point. The stream disappeared into the breakdown and reemerged at the edge of an 8-meter drop. Then two 7-meter drops both landed us in pools of water. Soon after the last drop, the stream disappeared again into breakdown. The large passage ended in ceiling collapse, which forced us to

stoop through a sandy tube and climb up through a rubble pile to reach a huge chamber. It is easy to see why the Canadians named this Hallelujah Hall. Either the cave was going to go or it was going to end. Depending on one's frame of mind, either could prompt such an exclamation.

Hallelujah Hall is 40 meters wide by 20 meters high and did end after 130 meters. At the up-dip end of the chamber, Hallelujah Hall appears to be the junction of two large





Jim Smith near The Vortex in Santa Cruz. The way down is straight through the water.
Ron Simmons.

streams. At the lower end, the water all flows to a lower level via climb-downs through clean-washed boulders and a series of shafts. Ron and I climbed into the lower level, astonished that the cave had become so much smaller. The walls in this section of the cave are beautiful light-gray to cream-colored recrystallized limestone with white calcite in the fractures. Ahead we could hear the thunder of a big stream crashing down a pit. We rigged a PMI rope to a natural belay and descended a 9-meter drop to a deep pool of water. Across the pool, we immediately encountered another drop, which had a 24-year-old piece of Goldline still hanging in it. Looking down the 6-meter drop, I could see the rope hanging against the flowstone wall, gnarled, knotted, and frayed, a testament to high water. Still, it was in better shape than I would have expected.

The next drop was really a continuation of the last, and a rebelay allowed a 9-meter drop down flowstone. We were about out of rope and only had the tail end of our last rope to rig a 13-meter pit. I

tied a 9-millimeter rope onto the end of the line and prepared to cross a knot. There was just enough of the small rope to reach the bottom of the shaft, at a plunge pool obviously over my head, like most pools in the cave. I followed the stream down a watery chute that dropped 10 meters at a 45-degree angle. The passage was less than a meter in diameter, and it ended decisively. The cave had been getting smaller, and there was a parallel drop we could not free-climb to warrant a return trip. We figured we had de-

scended to a depth of 311 meters, and my altimeter more or less confirmed that depth.

On March 5, Ron and I went to the San Andrés valley to visit cave entrances discovered on our first walk. The first cave visited was named Nita Milpa. I descended an 8-meter pit that was followed by 30 meters of passage to a silt plug. The next was Di Nita, a 30-meter-long cave. The last cave was entered by Ron, who descended pits of 8 meters and 9 meters and followed 60 meters of passage. It had a tight crack and a blasting lead. The total depth of that cave was 35 meters.

On March 6, Ron and I went to Nanta Ridge to some cave entrances Laura Campbell and I had discovered in 1990. The caves are located next to a trail in a sinkhole region on the north side of Nanta Ridge. All of the caves turned out to be small and short. Ron and I took turns exploring the caves, as one person needed to stay on the surface to guard the rope and gear. The first cave was Nita Chuque, Moss Cave, a 9-meter pit to 100 meters of large passage that ended in a narrow rift. Total depth was 40 meters. Ron explored Cueva Filoso Piedra or Di Nita Quecha, Sharp Rock Cave. It had a 10-meter drop

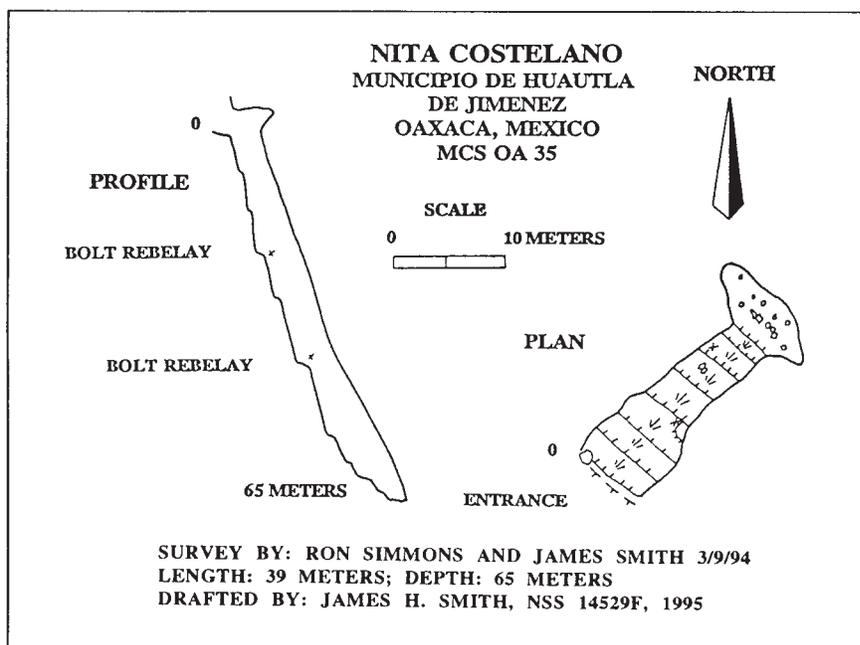
and is 45 meters long to a total depth of 18 meters. I found Di Nita Ina He, Fern Cave, which was 30 meters long and 6 meters deep. The next cave was Di Nita Hoa Nasque, Cave of the Two Eyes. It was 60 meters long and 20 meters deep.

On March 7, a team consisting of Carol Vesely, Ron Simmons, Matt Oliphant, Nancy Pistole, Rick Fritschler, and me returned to Santa Cruz. When we reached the first drop, we found that the 6-meter rope had been stolen, along with two Super Links. We had an extra rope, but we did not want another rope stolen. Matt felt that he could climb the guano-covered wall, so we pulled the rope down behind us. I am sure any locals who followed us into the cave were surprised to see no rope. After four hours of travel, we reached the last point of exploration. We descended the parallel drop 5 meters into a muddy crack. There were no side leads at the bottom, but a climb up a muddy wall might give access to a bypass. Matt set about the task, and after a single bolt he managed to hoist himself over the lip of the climb, only to find just an alcove. With all bottom leads exhausted, we began to derig, but kept a critical eye open for possible parallel routes or windows in the walls of the shafts.

Back in Hallelujah Hall, we spread out in the large chamber to look for leads. Hallelujah Hall is a large, steeply inclined passage formed at the junction of two passages. Did Hallelujah Hall's original watercourse follow the dip of the beds, or had it made an abrupt turn along the strike, before it was pirated by the shaft series? A lead upward was seen, and Matt lassoed a slab. We all assisted in pulling the rock down, but the lead at the top didn't go. I double-checked a lead Ron had pushed and went 60 meters further, trending upstream. I did a hairy 8-meter climb up and followed a passage for 15 meters before being stopped by a 10-meter climb. With all leads exhausted, we derigged twenty-six ropes.

On March 9, Ron and I began our search for new caves in the Plan de Escoba valley between Nanta Ridge and Agua de Cerro. The area we searched was closer to Nanta Ridge. We took the high trail system along the ridge and walked the main trail that crosses Nanta Ridge to Agua de Cerro. On the left side of the trail we found a huge headwall with a cave entrance situated between it and a huge boulder. It was a climb-down, walk-in entrance. Large walking passage led to a drop into a large chamber. We rigged and descended the 15-meter drop and climbed up a steep slope on the opposite side of the room. Ron said the cave was vaguely familiar as one he and Mark Minton explored years earlier. We did a climb into a narrow canyon and followed tremendous wind. There were no footprints, and it seemed like a new discovery, until we got to a constriction that had obviously been blasted. Shortly thereafter, we came to a second entrance on the other side of the ridge of karst. We estimated the cave's length at 200 meters and the depth at 50 meters.

After 1.5 hours in that cave, we headed toward Nanta Ridge and asked a drunken Mazatec if he knew of any caves. He wanted money, of course, and he led us to a new discovery Minton had missed. He took us into the thickest fern grove I have ever seen. Hidden among 5-meter-tall ferns was a pit 5 meters long and 2.5 meters wide. A headwall of steeply descending limestone opened into a nice shaft. We were not able to bottom the shaft, as we were only able to descend 18 meters before running out of rope. It looked like we had found



another Nita He. We named it Nita Costelano, after our guide. Glowing with pride and anticipating financial reward, he showed us a couple of other caves. He must have expected to get rich, since he grumbled after receiving only enough money for a beer.

On March 10, we returned to the Plan de Escoba valley to look for an entrance Laura Campbell and I had seen in 1990. We had seen a black hole on the side of a karst hill and did not know if it had been checked. Ron and I were able to relocate the cave, only to find out that it was not what we expected. The cave has six entrances and passes completely through the conical hill. It is an old cave with large formations and large tunnels, but no artifacts except for a few pottery shards and human bones. It looked like an ideal burial cave. We later found out the cave had been mapped in 1980 and

was called Nita Cha, Old Cave. We estimated its length at 150 meters.

After touring Nita Cha, we rigged Nita Costelano. I descended first and broke up the 73-meter pit into two sections with a rebelay. I set two bolts. On the bottom I was disappointed to find no leads. *Es lástima!*

Our last day of exploration was March 11, which we spent finishing two other leads Señor Costelano had shown us. We named the first cave Nita Tinzo, Goat Pit. Ron explored its drops of 5 and 15 meters. The second, Cueva de Mal Día, was a 20-meter pit, also explored by Ron. Neither went anywhere. The day was extremely cold and foggy, which greatly hampered looking for new caves. Visibility was only 20 meters, so we were reluctant to follow any new trails or walk into the hills.

Cueva de Santa Cruz, Oaxaca

En 1994 cueveros volvieron a visitar Cueva de Santa Cruz, que los cueveros canadienses habían explorado y topografiado en 1970. Los exploradores originales encontraron casi todo, y la cueva sigue con la misma profundidad: 313 metros. Varias cuevas chicas en la misma área se exploraron.

CERRO GRANDE 1995–1996

Chris Lloyd

The holiday season at the end of 1995 saw the first expedition to Cerro Grande in Jalisco and Colima, Mexico, for over ten years. The Cerro Grande area, part of the Sierra Manantlán, is a well-karsted plateau with slightly more than 100 square kilometers at an elevation of over 2000 meters; the high point is over 2400 meters. The limestone appears to bottom out at about 500 meters elevation, giving the plateau tremendous potential to host a kilometer-deep cave. The area was first worked by a group of Mexican cavers headed by Carlos Lazcano, aided by some visiting French cavers, in the early 1980s. By 1985 they had found some eighty-five caves in the area, mainly pits, with six having drops over 100 meters and one a single 240-meter pitch. These are documented in Lazcano's book *Las Cavernas de Cerro Grande: Estados de Colima y Jalisco* (Universidad de Guadalajara 1988, out of print). But none of them exceeded that 240-meter depth. After moving to Guadalajara, I heard these tales from local cavers, and I decided it was time to have another look, for surely there must be at least one route that goes all the way through.

So invitations went out to friends in four different countries, only to find that most were too impoverished to come or even send a note saying so. Complicated Internet communications (Mexico is a little quirky in this regard) managed to coordinate the arrival of one group of Brits from the Bristol Exploration Club and the newly formed Southern Cave Club. The final team was Andy and Angie Cave, Henry Bennett, and Skippy Gerard of the

BEC, Richard Blake and Vince Simmons of the SCC, Alexandra Taylor and Vicente Loreto of the Universidad de Guadalajara, and I. We were joined for a few days by Nick Hawks, a British geologist newly arrived in Guadalajara, and his wife and one-year-old daughter.

We had a beautiful campsite in an opening in the pine forest off a side-road north of the town of El Terrero, with dolines dropping off in three directions. The density of dolines there was quite impressive, especially once you realized that all those 10- to 80-meter-diameter dolines were merely small holes nested within kilometer-scale depressions. The big catch here is the soil, which, once disturbed by agriculture or logging or even the most benign of road-building, easily erodes into the dolines, clogging them up. This extent of soil development is quite unusual in limestone terrain, and I believe it can be attributed to ash eruptions from the nearby Volcan de Fuego, only 30 kilometers to the north.

Once we were settled in, at least two separate groups set off each day in search of pits to drop. One or two of the groups was accompanied by a local guide, who always had a target or three to keep the team busy. Over the first eight days, we managed to find and drop forty-two caves, all vertical pits. The vast majority were just one single drop to a dirt floor and less than 20 meters deep. A few were multi-pitch, leading us to think that we were really on to something, but they ended before getting 100 meters deep. The deepest cave was a single drop of 120 meters, where

Skippy lucked into rigging the rope in the one place where it would not touch the wall the whole way down.

One cave of note for its size, only 50 meters deep, but some 30 by 15 meters across, was dropped by Andy on Christmas day in the rain, a good effort, considering that the big to-do in Mexico is on Christmas Eve. To save placing an awkward bolt for a rebelay, a long line was thrown in as a deviation. This technique for achieving a free hang was employed numerous more times, as the majority of pits had slopes of dirt right to the lip. The deviation could be easily adjusted once a person was on rope and could see down the pit.

Six entrances were located that were blowing air and didn't have the standard collection of flies coating the walls. In some caves, these flies seemed to almost suffocate those who weren't prepared with full-face coverings. One of the blowing holes could not be entered even after being enlarged, while another went only down a 3-meter-squeeze. Two others managed two short pitches to about -30 meters, while the last two had five pitches each down to -70 and -90, where the air-flow was lost. One of these, Roadside Pit, needs some drilling to gain another pitch, while the other needs a skinny, determined pusher to see it to its end. Two other blowing entrances were described to us by the locals, but not located, and it is this type of lead that future parties should concentrate on. From our and previous cavers' experience, an entrance that is not blowing will end in a dirt floor or even, in one case, bad air.

The expeditions in the 1980s looked at about 10 to 15 square kilometers, all along the main roads at the time. This expedition covered about 6 square kilometers well and passed through another 6. That still leaves 70 percent of the plateau to be examined, certainly ample room to hide one going cave.

Access for future parties is a bit complicated, but not impossible. Since the explorations in the early eighties, a large portion of the plateau has been incorporated into a National Biosphere Reserve, though just which parts is not clear, and even the biologists administering it cannot show you a map of what they are supposedly administering. This was the result of the discovery of a perennial type of corn, possibly the mother of all corn, along with a high diversity of other plants. This reserve is administered by the Universidad de Guadalajara's biology department, which has established a research station in the town of El Terrero. To me, it looks like the establishment of this preserve, where cutting trees and growing corn is prohibited, was quite a disturbance to the local people. The researchers and the lo-

cal people have since developed a good working relationship, but the people have now become somewhat hostile to outsiders coming to tromp around in "their" woods and preserve. Lazcano and company had no such problems, so it is obvious what has changed the attitude of the local people.

The bottom line is that there are two groups of people that future explorers must deal with, and I suggest they start with the mayor of the local *ejido* and get his blessing first. The rest should sort itself out in due course. We trained our guide, Oscar, a nephew of the current mayor, in caving, and he would be thrilled to have other parties come up so he can do some more caving. He is also a field assistant for the university researchers, so he is out walking the woods all the time, and he now knows exactly what to look for. The best time of the year for visits to the area depends on whether you want warm and wet or cold and dusty. July through September is the warm and wet time, with May and July being hot and dry. At Christmas, we had heavy frosts or rain almost every night, with very pleasant, sunny days. It

is possible to drive to El Terrero on the plateau in any kind of vehicle, but driving past El Terrero requires a vehicle with good clearance, but not four-wheel drive.

We still believe that there is a deep cave hiding up there somewhere and that perseverance will eventually be rewarded. There are two major known resurgences, at the north and south ends of the plateau. The northern one is La Raza, the resurgence of the stream in Resumidero de Toxín, which, at 3 kilometers long, is the longest cave in Jalisco. It is not considered completely explored. Obviously something is feeding these outlets. It is just a matter of cracking through that seemingly impenetrable barrier at -240 meters. All the areas we explored were disturbed by the hand of man, and recent silting-up of small dolines was very evident. Some of these probably had open entrances as recently as five years ago. The areas of the actual biosphere reserve are supposedly protected from further disturbances, and these may prove the most productive places to look for blowing holes. There has to be one up there somewhere.

Cerro Grande 1995-1996

Hace muchos años, Carlos Lazcano exploró una parte del Cerro Grande, en los estados de Jalisco y Colima, y escribió un libro que describió ochenta y cinco cuevas. Después la área quedó sin atención de parte de cueveros hasta los fines de 1995, cuando Chris Lloyd organizó una expedición. En ocho días los participantes encontraron y exploraron cuarenta y dos cuevas nuevas, todas con tiros. La mayor parte eran de un solo tiro de menos de 20 metros, acabando en fondo de tierra. Una tiene tiro de 120 metros.

SÓTANO DE LOS TRES OJOS VERDES

Alan Cressler

During the week of Thanksgiving 1996, a large group of cavers from TAG (Tennessee, Alabama, and Georgia), Indiana, and New York visited the El Cielo region of the Sierra Guatemala in Tamaulipas. We were largely duplicating the efforts of many other cavers over the past thirty years. El Cielo is a vast protected area that contains a wide range of ecological habitats. It is mostly underlain by limestone. Very few people live within the preserve, and roads are scarce. Most

Forest Platt in the entrance to Sótano de los Tres Ojos Verdes.
Alan Cressler.



are old logging roads that have either grown over or are maintained only as trails. The few passable roads have been thoroughly traveled in the pursuit of caves. The people who live in the preserve have been questioned repeatedly by cavers. Our group was no exception. We talked to as many locals as we could find. We camped near the farm of Abraham Esqueda, and he showed us many of the caves he has been showing cavers over the years. This was not entirely a waste of time, because we gathered information for the Mexican Cave Survey maintained by Gerald Moni.

The large group divided into teams every morning, with most people traveling to remote areas to look for caves. Hating the bouncing ride in the back of a truck, a small group of us concentrated on areas within walking distance of camp. Sometimes we would cover several kilometers, finding many entrances and karst features, but we were having no luck finding anything on the grand Mexican scale.

Ted Wilson arranged for Abraham to join us for a day of walking to see some old caves and a couple of new ones. He took us to four caves on November 27. It is the last one that is worth writing about. We walked an old logging road through a thick mix

of temperate and tropical trees. It was so grown over that Abraham and Ted were both swinging machetes to clear a trail for the rest of us, Jeff Dilcher, Forest Platt, Troy Roberts, and me. We entered a lush karst-pinnacle area that was covered with ferns, palms, and bromeliads. To the left of the trail was an obscure rock sink with three green, mossy holes in the bottom. We were not overly excited when a rock fell what sounded like only about 30 meters: just another Mexican dud pit. But we all planned to bounce the pit and map it, even though darkness was fast approaching. Forest was the first down, and we taped it as a 35-meter pit. As the rest of us suited up, Forest was checking for leads. She yelled to bring more rope. When quizzed on the depth of the next drop, she said it was about 12 meters deep. We had two ropes, a 90-meter for the surface rig and a 30-meter push rope. I went down next with the push rope, rappelling through one of the three green eyes and into a heavily decorated chamber. At the bottom was a steep talus slope that ended at a formation wall with a smallish hole in the floor. Forest was right; one could only see about 12 meters. I dropped a rock down the hole, and I'm not sure if we heard the final boom. At that point, we became quite excited. Everyone made it to the bottom of the entrance drop, and repeated rock-drops confirmed that there was a deep pit. A place for a rebelay was found above the drop, and the end of the entrance rope was tied to the push rope. We were quite sure that the rope would not reach the bottom, and there was a knot to cross.

Sótano de Escudo Escondido

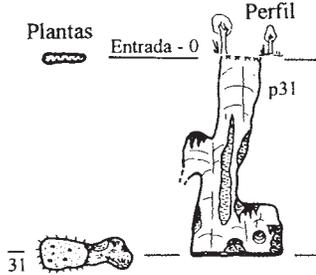
localizacion: 22m y 147° de Sotano do los Tres Ojos Verdes

Profundidad: 31 Metros

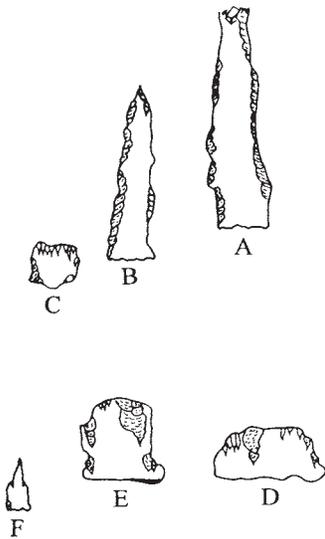
Longitud: 13 Metros

Suuntos y Cinta 11/27/96 por:

David Cole
Alan Cressler
Marion Ziemons



Secciones Transversal



Sótano de Los Tres Ojos Verdes

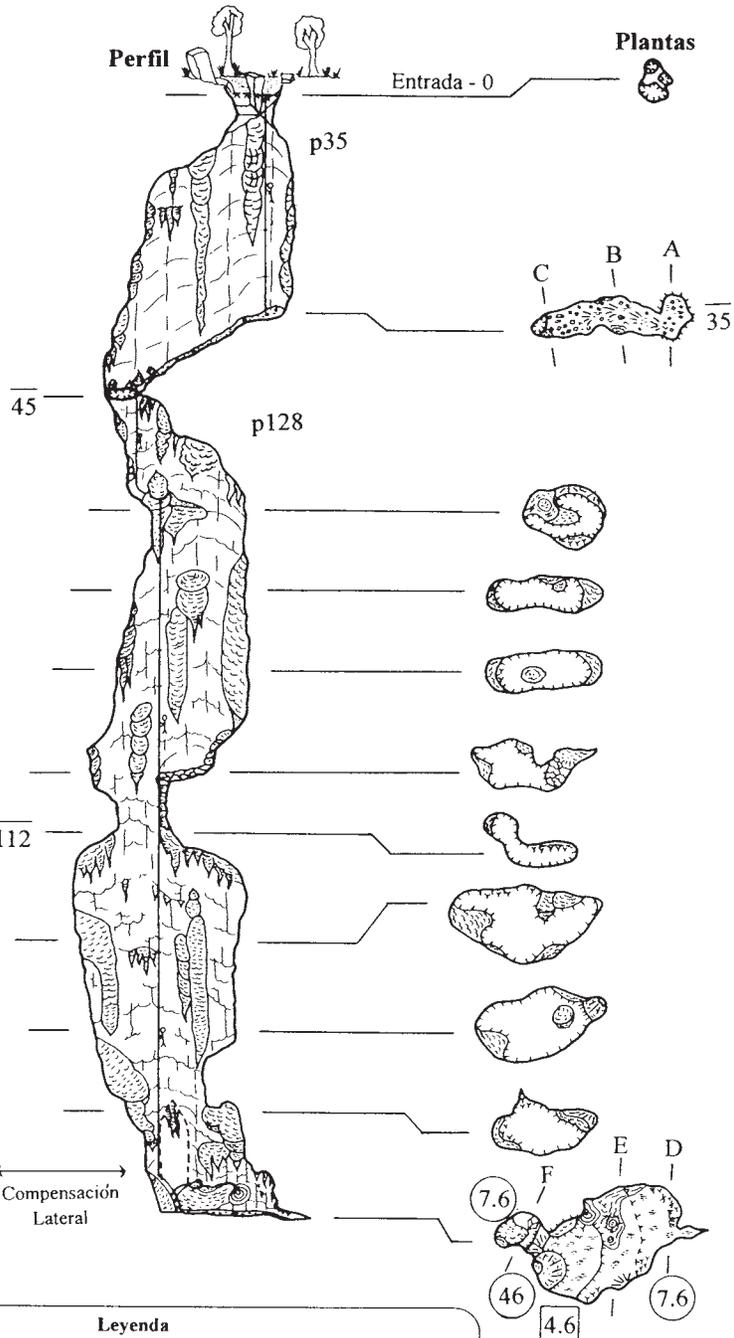
El Cielo, Mexico; Gómez Farias Cuadrángulo

Profundidad : 176 Metros

Longitud: 52 Metros

Suuntos y Cinta, 11/27/96 por:

David Cole
Jeff Dilcher
Marion Ziemons



Leyenda

Línea Goteo	Travertina	Arena	Gours	Lodo
Profundidad de tiro	Profundidad p10 bajo Entrada	Estalactita	Macarrones	
Techo Bajo	Pendiente	Helictita	Bioques	
Altura del Techo	Altura de repisa	Escudo		

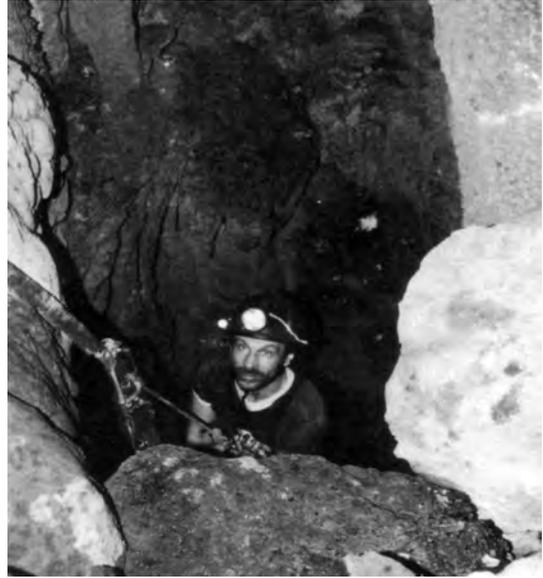
Ziemons/1997

Everyone was willing to let me check out what I could. Past the 12 visible meters, the pit became a huge chamber with copious massive formations. Eighteen meters down, there was a ledge that turned out to be the top of a huge bell canopy. Past that, the pit became even larger. I passed the knot in free space and very quickly came to the other knot in the end of the push rope. Before changing over, I dropped a rock, which fell over 60 meters. We taped what I had done at 57 meters.

The next day, November 28, Ted, Forest, Troy, Jeff, and I were joined by Marion Ziemons and David Cole. We brought a 150-meter rope for the big drop. While the pit was being rigged, Marion, David, and Jeff began the survey. With my 100-meter tape, we determined that the depth of the big pit was 128 meters. The whole cave was so heavily decorated that the only place we actually saw limestone was at the entrance. The exploration crew waited at the

bottom of the drop for the survey crew. There was a formation grotto to explore while we waited. Once we were all together, exploration continued down a 5-meter climb. Unfortunately, the cave ended there. With the survey complete, we left the cave, but we left it rigged for the rest of the expedition to visit. The survey data show a total depth of 176 meters

I was one of the first out, and, to kill some time, I was botanizing among the karst pinnacles. About 30 meters to the southeast of Tres Ojos I located another entrance. This turned out to be a 31-meter pit to a small amount of passage. We could not find any connection with the big pit. We named this Sótano de Escondido Escudo. We surveyed the pit and did an overland survey to the big pit.



Ted Wilson at the top of the 128-meter drop. *Alan Cressler.*

The new Sótano de los Tres Ojos Verdes turned out to be the big find of the expedition. Local guides don't always show the same caves to everyone who comes into the area.

Sótano de los Tres Ojos Verdes

Esta es una nueva cueva en la Sierra de Guatemala, Tamaulipas. Tiene un tiro de 128 metros y una profundidad total 176 metros.

RIDGEWALKING IN XILITLA

Gerald Moni

Cavers from Tennessee, Alabama, and Georgia made eight trips to the Xilitla Plateau between November 1993 and December 1995 to search for new caves. All of these trips included tourist visits to the many fine caves and pits in this area. The TAG cavers were joined by other cavers from Florida, Missouri, Virginia, and Indiana.

During Thanksgiving week 1993, twenty cavers searched for and explored caves south of the town of El Lobo, located on Highway 120, down a dirt road past the town of Agua Zarca. This dirt road goes east to the town of Pisaflores, located in the valley of Río Moctezuma. The main objective was to explore and map Sótano de Alfredo. Alfredo was the deepest cave we found at Xilitla. The cave has thirty-four drops and is 673 meters deep. (See *AMCS Activities Newsletter* 21, pages 71–75.) While Alfredo was being explored, other cavers searched for new caves. They discovered nine new caves, the best of which was Sótano Brillante, which at the time was believed to be very deep. However, on a later trip the cave was found to be 214 meters deep, with four pits. (See *AMCS Activities Newsletter* 21, pages 76–78.) A second pit, Sótano de La Yesca, was found, but not done.

A few weeks later, three cavers searched for caves north of Pinalito de la Cruz and along the road from El Lobo to Pisaflores. They found seventeen new caves. Most were small, but two were interesting. Cueva de Chalahuite was the local water supply and went down-dip for 120 meters in depth, without any pits. Sótano de Catarino had nine pits and went down 195

meters. We explored down 120 meters on this trip, and the final push was done on the next trip. This cave is one of many caves that lie between a large sinkhole valley next to Highway 120 at El Lobo and the probable resurgence at the bottom of Río Tancuilín canyon. Locals had visited the bottom of this canyon and said they saw a cave with a stream coming out of the entrance 20 meters up a cliff. They were not able to climb up to the entrance. This cave is 900 meters below and 4 kilometers south of El Lobo, just south of and below Potrero del Llano. We never visited this cave.

The following March, thirteen cavers continued exploring and searching for caves along the road and its branches from El Lobo and Pisaflores. They found twenty-four caves and finished exploring and mapping Sótano de Brillante. Most of the caves found were duds; the most significant was Sótano de Vidas. This cave had five pits and went down an estimated 128 meters.

During Thanksgiving week 1994, four cavers found seven caves. We also explored and taped Sótano de La Yesca, a blind 115-meter pit. Another group of mainly Huntsville, Alabama, cavers continued the Sótano de Lutevio surveying project. Lutevio has twenty-two pits and is estimated to be 460 meters deep.

Next Christmas, a group from VPI Grotto in Virginia went to Tamapatz, mostly to tour known caves. We did find seven new caves west and southwest of Tamapatz. The entrance pit of Sótano de Octufu is a large, free-fall drop of

125 meters. North of Octufu, we found Hoya de Guadalupe, another large pit. Its first pitch is 83 meters. On this trip we only had time to do the first drop in each cave.

During February 1995, five cavers found three more caves and explored Hoya de Guadalupe. This cave went down seven pits to a depth of 223 meters. Cueva de Muchas Columnas was found and explored. This cave is 200 meters long, with one long passage filled with massive flowstone columns.

The following November, eighteen cavers went to Tamapatz to find more caves, explore Sótano de Octufu, and do the many fine pits nearby. The first two days, a group of eight cavers explored and mapped Sótano de Octufu. There is a ledge 59 meters down from the lip of the entrance pitch. From this ledge, a parallel pitch of 87 meters goes to the bottom of Octufu. The best new cave found was Pozo de Deseos, a 75-meter pit that is almost 30 meters across. The entrance is a walk-in on the side of a bluff. A group of cavers walked above the cliffs above and west of Sótano de las Golondrinas. They found two small caves, Cueva de Arena and Sótano de Dar Gracias. On the way home, six cavers explored La Hoya del Diablo, which is 60 kilometers west of Valles, just south of Highway 70. The pit is 150 meters wide and 150 meters deep. The pit walls slope down to the bottom, and the rappel is not free.

Over Christmas 1996, another group of VPI cavers visited Tamapatz. Five new caves were found, all small. Four cavers again went above the high cliffs west of Golondrinas. They found two small

Xilitla Area Caves Found November 1993 to December 1995
Gerald Moni

	location map	length (m)	vertical extent (m)	deepest pit (m)	number of pits	
Caves in Querétaro						
113.	Sótano de Roteo	1	6	20	20	1
114.	Cueva de Jorge	1	40	6		
115.	Cueva de Canica Verde.....	2.....	30.....	12.....		
116.	Cueva de Ledesma	2	90	100	33	2
117.	Sótano de Melchicedeg	2	12	40	25	2
118.	Cueva de Primitivo	2	20	10		
119.	Sótano Chirrido	2	10	16	10	1
120.	Sótano del Tule.....	2.....	2.....	17.....	17.....	1
121.	Cueva de Caritina	2	2	16		
122.	Sótano Dulce	2	11	17	17	1
123.	Sótano de Aroadio	2	34	68	29	3
124.	Cueva de Pablo y Tomás	2	30	18		
125.	Sótano de Marquéz.....	2.....	110.....	35.....	9.....	1
126.	Cueva de Cruces	2	30	18		
127.	Cueve de Cipriano	2	70	21		
128.	Sótano de Anizeto	2	60	34	17	4
129.	Sótano de Catarino	2	300	195	32	9
130.	Cueva de Marsigos.....	2.....	29.....	8.....		
131.	Sótano de Cilantrón	2	120	23	19	1
132.	Sótano del Argumento	3	5	33	32	1
133.	Sótano de Galina Muerta	3	18	37	29	1
134.	Sótano de La Yesca	3	7	118	115	1
135.	Sótano de Abril.....	3.....	10.....	18.....	16.....	1
136.	Cueva El Tigre	3	100	15		
137.	Sótano de Oso Rosado	3	30	40	19	1
138.	Cueva de Sarro	4	60	15		
139.	Cueva de Crucitas	4	45	22		
140.	Cueva Queso Suizo.....	4.....	21.....	5.....		
141.	Cueva de Requesón	4	20	8		
142.	Cueva de Tlacuilola	4	50	12		
143.	Sótano de Moises	4	30	30	27	1
144.	Sótano de Lorrretto	4	10	56	56	1
145.	Sótano Brillante.....	4.....	53.....	214.....	69.....	4
146.	Cueva de Tarántula Gateando	4	40	6		
147.	Sótano de Graciela	4	100	80	54	1
148.	Sótano de Victorino	4	8	30	28	1
149.	Sótano de San Onobre	4	6	58	58	1
150.	Sótano de Piedra Parada.....	4.....	15.....	14.....	12.....	1
151.	Cueva de Geraldo	4	20	15		

	location map	length (m)	vertical extent (m)	deepest pit (m)	number of pits
Caves in Hidalgo					
152. Cueva de Alvaro	4	15	12		
153. Sótano de Tres Ojos	5	9	21	19	1
154. Sótano Reseco	5	14	40	36	1
155. Sótano de la Guadaña.....	5.....	6.....	20.....	15.....	1
156. Cueva de El Rayo	5	130	65	8	1
157. Sótano Tapado	5	30	30	12	1
158. Cueva de la Cuesta	5	12	5		
159. Cueva de los Pretiles	5	80	20		
160. Cueva de Xochicoalco.....	6.....	40.....	6.....		
161. Sótano de Lonisio	6	30	40	7	1
162. Sótano de Cerro Grande	7	6	85	85	1
163. Sótano Bailando	7	19	32	27	1
164. Sótano las Vidas	7	150	128	29	5
165. Cueva de Marcelina.....	7.....	60.....	45.....	16.....	2
166. Cueva de Chalahuite	7	300	120		
167. Sótano de Dometilo	7	25	30	29	1
168. Cueva de Caracol	7	100	15		
169. Cueva de Trejo	7	120	6		

Caves in San Luis Potosí (Tamapatz area)

170. Cueva de Cuguixtle.....	8.....	100.....	40.....		
171. Cueva de Soyamiches	8	25	8		
172. Cueva de Arena	8	45	30	27	1
173. Sótano de Dar Gracias	8	12	46	45	1
174. Hoya de Guadalupe	8	50	223	84	7
175. Cueva de Guadalupe.....	8.....	20.....	16.....		
176. Cueva de las Golondrinas	8	130	80	29	1
177. Sótano de Octufu	8	75	215	134	2
178. Cueva de Mejia	9	30	8		
179. Sótano de Mejia	9	36	69	52	1
180. Cueva del Caracol.....	9.....	79.....	24.....	6.....	1
181. Cueva de Muchas Columnas	9	200	20		
182. Cueva de Anita	9	25	6		
183. Cueva de Vallo	9	15	3		
184. Cueva de Santiago	9	100	12		
185. Cueva de Infierno.....	10.....	30.....	8.....		
186. Pozo de Deseos	10	35	76	75	1

The first 112 caves, found December 1990 through April 1993, are listed and described in *AMCS Activities Newsletter 20*, pages 93–108.

caves, the largest being Cueva de Cuguixtle, a one-room cave 100 meters long and 40 meters high.

In five years of searching for new caves in the Xilitla Plateau, we have found 186 new caves, visited all of the popular tourist pits, and explored many caves found by other groups in the area. We have explored for caves west of Highway 120, along Highway 120, and around the town of Tamapatz. We have tried to do a complete search by at least driving down the roads and inquiring about caves from the locals. However, this area is so vast and the caves are so difficult to find that we have, at best, found only a fraction of the caves in these areas. It will take many years and a lot of hard work before most of the caves in the Xilitla Plateau are found.

Reconocimientos en el área de Xilitla,
1993-1996

Cueveros de sureste de los EEUU had estado buscando cuevas nuevas en los alrededores de Xilitla, y después en Tamapatz, San Luis Potosí. Este es el segundo y final reporte sobre sus descubrimientos. El informe de las primeras 112 cuevas se encuentra en *AMCS Activities Newsletter* no. 20.

CAVE DESCRIPTIONS

These descriptions have been written by the editor based on information in cave-report forms supplied by Gerald Moni. References to "elsewhere in this issue" are to Jim Smith's article on explorations in the Sierra Madre Oriental.

113. Sótano de Roteo, Qro. Nineteen hundred meters north of Pinalito de la Cruz on the southeast side of a roughly flat mesa.

This 20-meter pit is 1.5 by 3 meters at the top and 5 by 6 meters at the bottom.

114. Cueva de Jorge, Qro. Entrance 1 is in a cliff facing southeast 2.8 kilometers northeast of Pinalito de la Cruz. Entrance 2 is 3 meters west of entrance 1.

Entrance 1 is 5 meters wide and 6 meters high. Entrance 2 is 0.3 by 0.3 meters. The cave is one room 12 meters across, with a passage to the left 10 meters long.

115. Cueva de Canica Verde, Qro. Eight hundred meters south of El Lobo, 130 meters vertically above the road, 5 meters to the left (east) of a water pipe in a small gully. This cave is 50 meters west of and slightly higher than Cueva de Ledesma (number 116).

The entrance is 1.6 meters high and 1 meter wide. The passage leads to a small room, and 3 meters to the right is a 3-meter climb down to a short walking passage, beyond which some

crawling leads to the mud-filled end.

116. Cueva de Ledesma, Qro. The entrance is at the bottom of a large sink that terminates an arroyo. It is 50 meters east of and slightly lower than Cueva de Canica Verde (number 115), 30 meters east of the small water pipe and 30 meters above the larger main pipe.

The entrance is 3 meters wide and 7 meters high. A slope leads down 20 vertical meters to a 10-meter pit. Six meters further is a 33-meter pit, and a side-passage goes 6 meters. At the bottom of the second pit, a 1.3-meter climb leads down to a crawl- and stoopway 25 meters long that slopes down 3 meters vertically to a 10-meter climb. At the bottom of this climb, a small infeeder goes 15 meters and a tight crawl with three sharp bends goes 6 meters to a 15-meter climb, at the bottom of which is a 3-meter crawl to the end. There is good airflow higher up in the cave, but none at the end.

117. Sótano de Melchicedeg, Qro. One kilometer south and slightly west of El Lobo, 250 meters above the road, 75 meters vertically above and slightly to the right of a small spring that supplies some of the water to El Lobo. A small pipe leads from the spring.

The entrance pit is 0.8 meters in diameter and drops 13 meters to the tight top of a second pit that is 25 meters deep, with a major ledge 5 meters down and the remaining 20 meters against flowstone. The bottom is 5 meters by 8

meters, and a small hole that is too tight goes down 10 more meters.

118. Cueva de Primitivo, Qro. Eleven hundred meters south and slightly west of El Lobo, on the mountainside 330 meters above the road. In a large sink on the property of Melchicedeg Rubio.

From the entrance, which is 6 meters wide and 2.6 meters high, a large walking passage slopes downward for 20 meters to a room. This cave contains a small colony of bats.

119. Sótano Chirrido, Qro. Fifteen hundred meters south-southwest of El Lobo, on a mountain 380 meters above the road, just above a flat, level ridge shown as a sink on the topo map.

The entrance is 1 meter in diameter, and the entrance pit drops 10 meters to a slope, which leads to a tight 1.6-meter climb down to a small dome room.

120. Sótano del Tule, Qro. North of Potrero del Llano and 260 meters higher, 75 meters northeast of Cueva de Caritina (number 121). On the east slope of a pass between two ridges.

The 17-meter pit has an entrance 0.5 meters in diameter and a ledge half-way down.

121. Cueva de Caritina, Qro. North and 220 meters above the dirt road at Potrero del Llano. Eighteen hundred meters west-southwest of the peak of Cerro el Tule.

The entrance is 0.8 by 0.5 meters and leads to a narrow canyon that is easily climbable, with some flowstone.

122. Sótano Dulce, Qro. Six hundred meters south of La Yerbabuena, on a west slope 6 meters above a major trail in the valley floor. Fifty meters vertically below the El Lobo-Agua Zarca road. Two hundred meters northeast of Sótano de Aroadio (number 123).

The 17-meter pit is 8 meters long and 1.5 meters wide at the top.

123. Sótano de Aroadio, Qro. Ten meters vertically below the El Lobo-Agua Zarca road and 650 meters south of La Yerbabuena, in a cornfield in an arroyo. Two hundred meters southwest of Sótano Dulce (number 122).

The entrance is 8 meters by 3 meters. A slope leads 9 meters vertically to a 20-meter pit. At its bottom, an 8-meter sloping passage leads to a 14-meter pit, at the bottom of which a 50-meter passage 3 meters high leads to a dome and the third pit, 14 meters deep and 1 meter in diameter, to a small break-down chamber.

124. Cueva de Pablo y Tomás, Qro. On the west side of a valley at the base of a high bluff, 550 meters south of the road at Potrero del Llano.

The obscure entrance is 2 by 1.5 meters. A second entrance is a small

skylight. A steep slope leads to a 2.5-meter pit that can be climbed. The main passage is a canyon that cuts back to the left and slopes down to a small room with some formations. On the right a short distance beyond the down-climb, a short climb up leads to a second passage that slopes down to the bottom of the cave.

125. Sótano de Marquéz, Qro. Eight hundred meters south of Potrero del Llano on the west slope of Cerro la Silleta. Fifteen meters north and above the dirt road to the communications tower. The entrance faces outward at 240 degrees.

The entrance to the 9-meter pit is 2.4 meters long and 0.6 meters wide. The pit goes to a 5-meter-long slope and three or four climbdowns that follow a stream. The cave ends in silt in a room 1.9 meters in diameter, but there is a high-level lead.

126. Cueva de Cruces, Qro. On the west side of the valley and 40 meters above its floor, 800 meters south of the road at Potrero del Llano, on the southeast side of hill.

From the 2-by-1.5-meter entrance, a 1.5-meter climb down leads to a large, decorated chamber. To the left of a partition of formations, a pit slopes down about 7 meters. A slope on the other side of the partition leads to the bottom of the pit, from which a short passage leads to a 2-meter climb up into a small, final room.

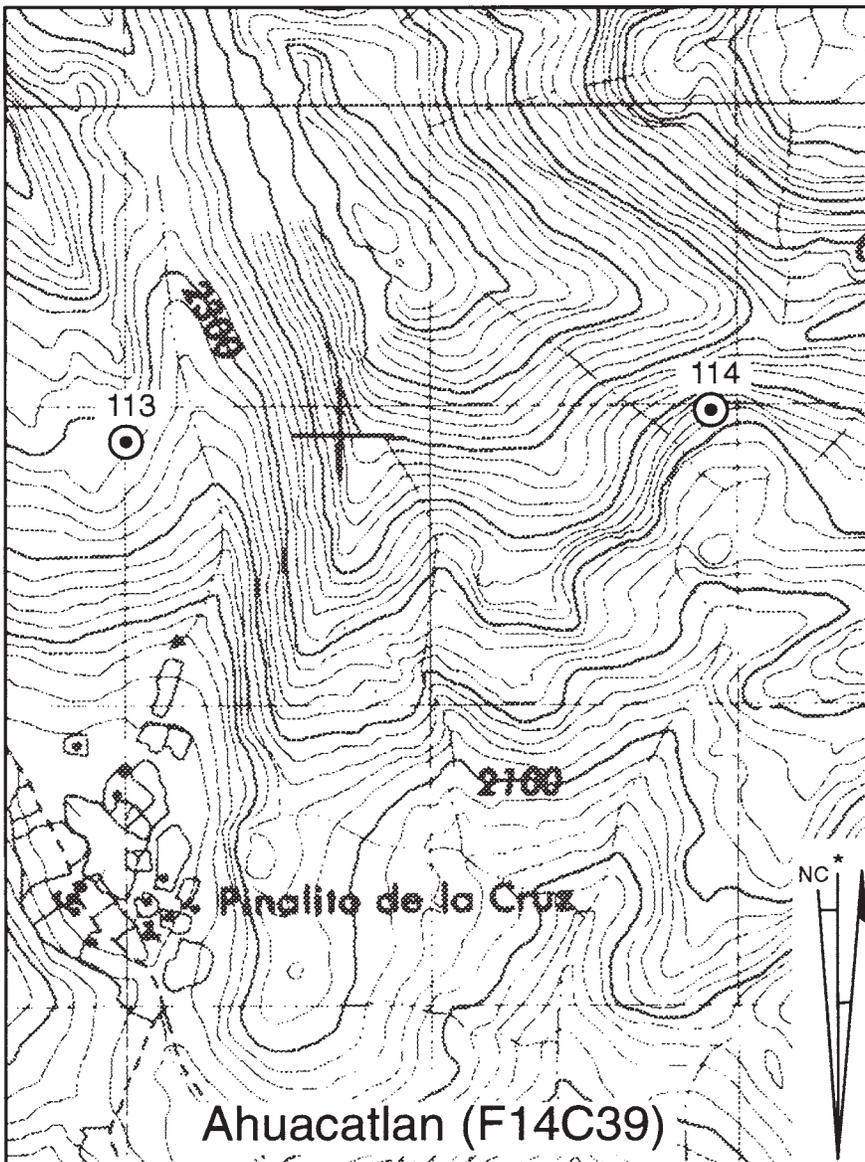
127. Cueva de Cipriano, Qro. Eleven hundred meters south of Potrero del Llano, on the east side of and 10 meters vertically above the floor of the valley. On the west escarpment of Cerro la Silleta. The cave is 30 meters west of an 8-meter pit.

The climb-down entrance 0.6 meters in diameter leads to a sloping passage 1 meter wide and high that ends at a mud bank that could be dug. A small stream is encountered 30 meters inside, and there is some airflow.

128. Sótano de Anizeto, Qro. On the west side of Cerro la Silleta, 350 meters south of Potrero del Llano, 20 meters vertically below the dirt road to the communications tower. The entrance faces 240 degrees.

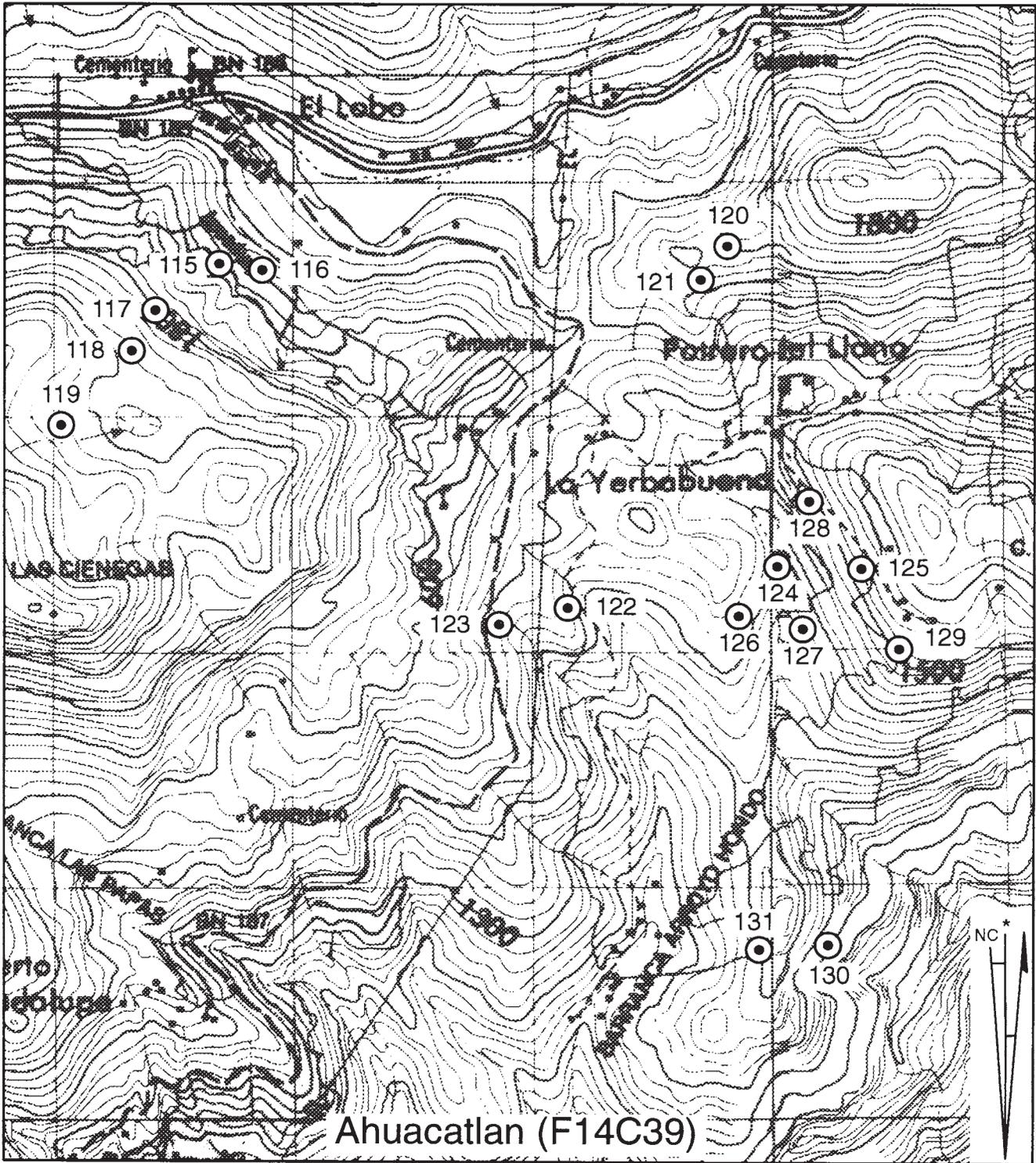
The 17-meter entrance pit is 1.2 meters in diameter at the top. Its bottom slopes to a series of pits 2.4, 4, and 4 meters deep. At the bottom, a crawl with little air or water becomes too tight.

129. Sótano de Catarino, Qro. Below some houses, on the southeast slope of

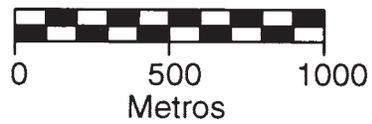


Map 1





Map 2



Cerro la Silleta, 1.3 kilometers south of Potrero del Llano. Entrance faces 140 degrees, 30 meters below the road going to the communication tower and 4 meters left (up hill) from a trail.

The entrance is 6 meters long and 1.5 meters wide. A 9-meter pit goes to an 8-meter slope, a 5-meter pit, 6 meters of passage to a 32-meter pit, 8 meters of passage to a 24-meter pit, 30 meters of passage to a 3-meter pit, 30 meters of passage, dropping 6 meters vertically, to a 4-meter climb-down, 23 meters of passage to a 5-meter pit, and 12 meters of passage to a 4-meter pit, at the bottom of which was a meter-long sodastraw. The next section is a 60-meter-long stoop with a flat chert

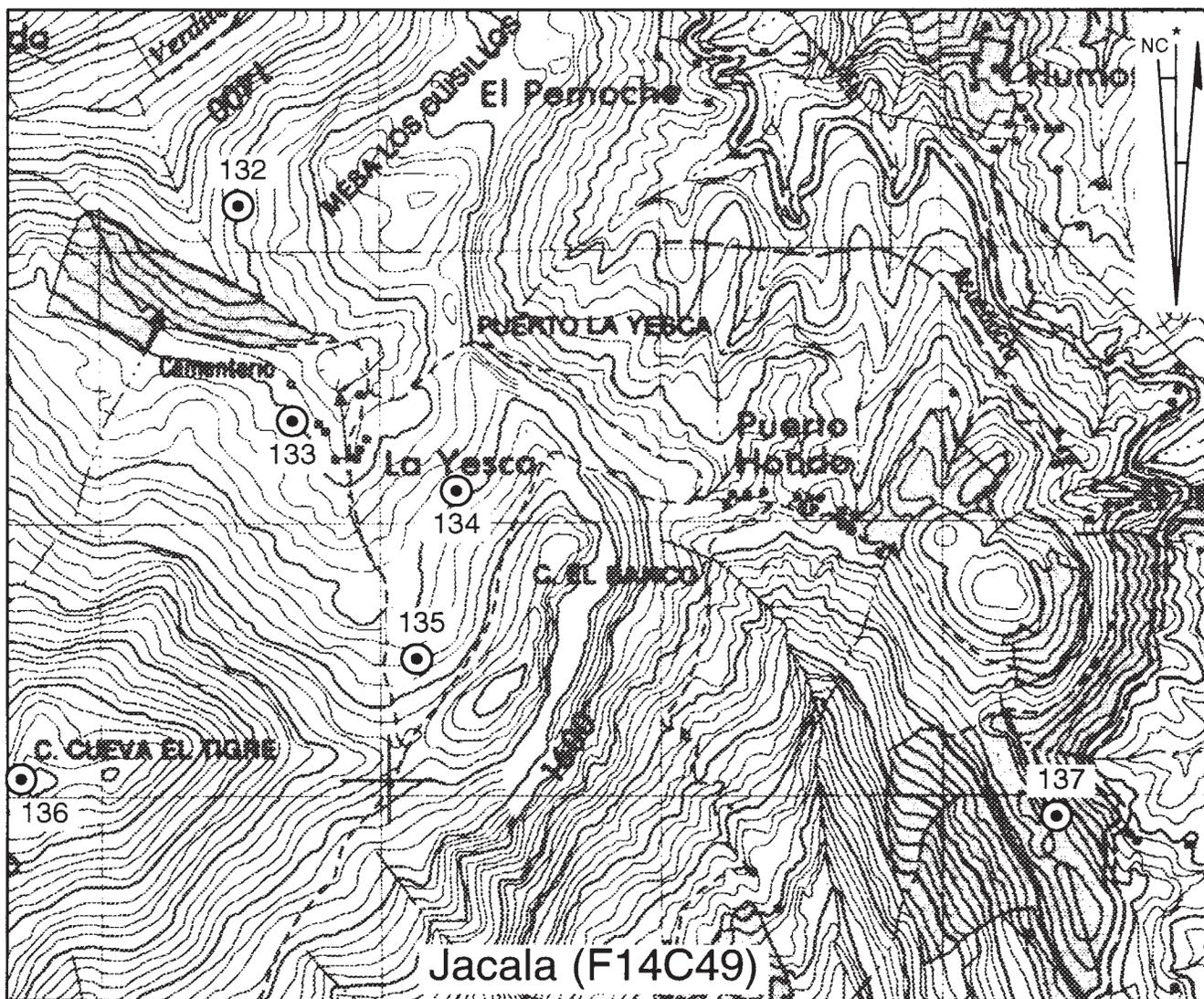
floor sloping down at 40 degrees. There are a couple of bends and chimneys over 8-meter holes in the floor. The passage continues, to the left, into a low (almost a crawl) canyon to a 10-meter climb-down, at the bottom of which was a larger dome and then a narrow, 60-meter-long canyon, beyond which a short section of walking passage leads to a 10.5-meter pit. At its bottom, a very tight canyon goes to a formation block with air howling through. A hands-and-knees crawl goes to a large room and a good-sized dome room. A 4-meter climb-down leads to a room with a 12-meter pit. Down-slope is too tight, but a 2-meter climb up goes to an upper level, then

back down a muddy slope. A small, muddy hole at the bottom led to a 2-meter climb down into a muddy, canyon stream passage. The stream goes to the left and gets too tight. The incoming passage goes upslope to a dome with a lead at the top, but no airflow.

130. Cueva de Marsigos, Qro. Nine hundred meters east of Barranca Arroyo Hondo (Naranjo); 4.6 kilometers southeast of El Lobo. From town, hike uphill (east), cross the top, and go down steep trail to the bottom of the 25-meter-high bluff, which can be seen from the road to Neblinas.

Shelter cave with three entrances in the bluff. Total length 29 meters.

131. Sótano de Cilántrón, Qro. Six

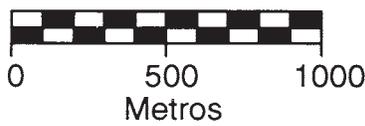


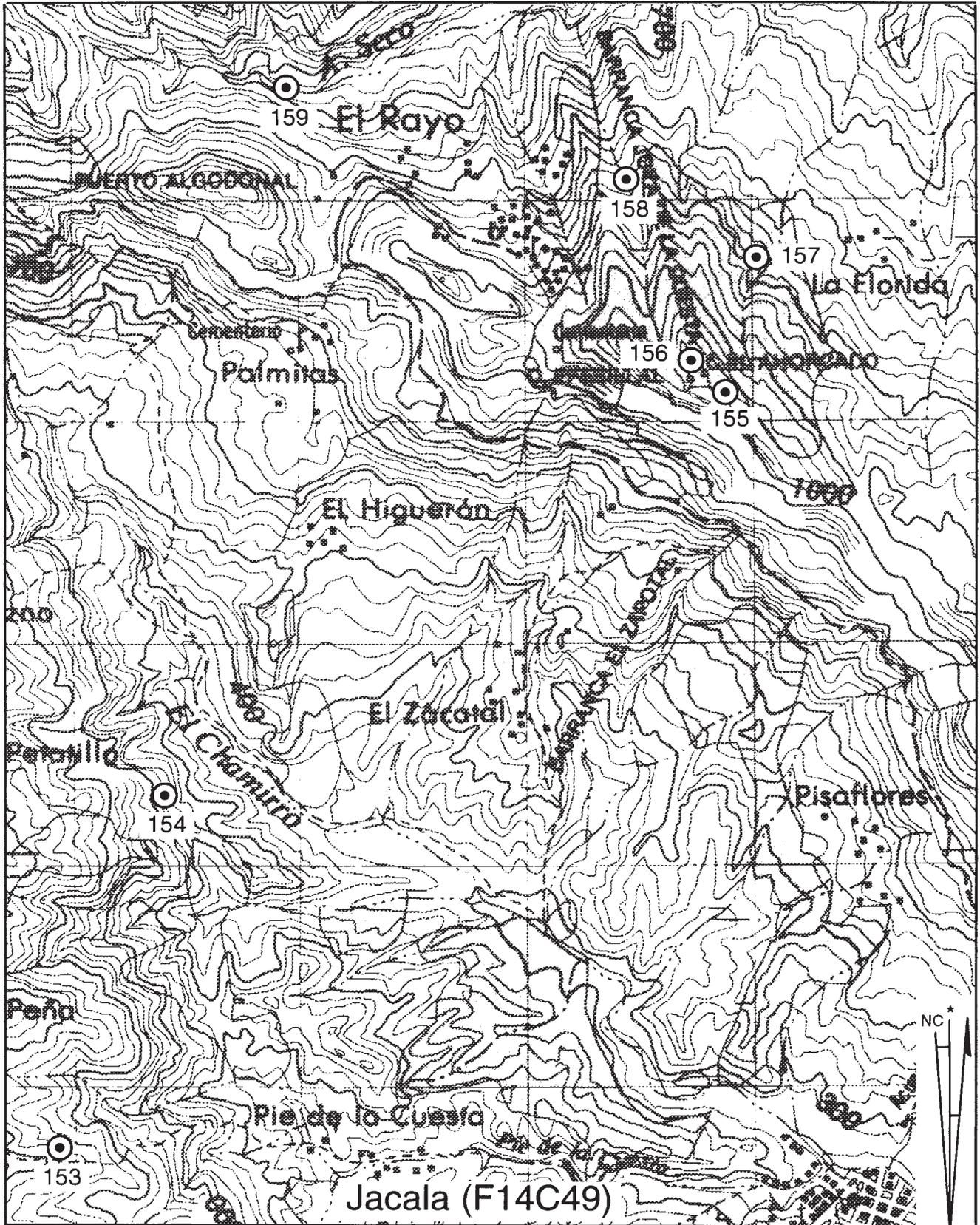
Map 3



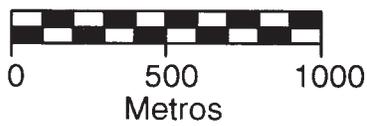


Map 4





Map 5



hundred meters east and 150 meters above the village of Naranjo (Barranca Arroyo Hondo). Entrance faces 260 degrees.

The entrance is 20 by 8 meters, and the pit drops 19 meters to a large room 100 meters long and 30 meters wide. A side passage goes 30 meters and ends at a pool of water 6 meters across and 2 meters wide.

132. Sótano del Argumento, Qro. One kilometer north-northwest of La Yesca. From where the main trail into La Yesca from the north reaches the west side of the sink, turn right through a gate and hike about 750 meters through corn and bean fields. Turn left and go down through the field for about 100 meters to the entrance, which has been fenced off.

The pit descends for 15 meters to a sloping ledge with a body-size hole to an additional 16-meter drop to a gravel-filled end.

133. Sótano de Gallina Muerta, Qro. One hundred meters west of La Yesca, on a bench above the houses on the south side of the sink.

The pit descends 28.7 meters, with a ledge at -10 meters. Both the bottom of the pit and the ledge contain garbage and dead animals. A talus and garbage slope drops an additional 8.5 meters to the end.

134. Sótano de La Yesca, Qro. One hundred meters east-southeast of La Yesca, on the hillside.

The sloping entrance is 5 meters wide and 6 meters high, and the pit is 115 meters deep.

135. Sótano de Abril, Qro. Seven hundred meters south-southeast of La Yesca and 1.5 kilometers southwest of Puerto Hondo. A small opening in a 2-by-2-meter sink.

A 1-meter-diameter chute leads to a 16-meter pit the same size. The sloping breakdown floor holds a large stalagmite. A path to the left leads to a small crawl into a tiny room 0.9 by 1.2 meters.

136. Cueva El Tigre, Qro. Three kilometers southwest of Puerto Hondo, on the west side of Cerro Cueva El Tigre, 30 meters down from the top.

The entrance is 10 meters high and 35 meters wide, with breakdown and many formations. The passage goes back to a junction, from which both right and left end quickly. There is no airflow.

137. Sótano del Oso Rosado, Qro. Twelve hundred meters south of Agua Zarca. One hundred meters above and west of the road from Agua Zarca to

Jagüey Colorado.

The entrance to the 19-meter pit is 3 by 3 meters. The walls are covered with flowstone and cemented breakdown. At the bottom, a 19-meter slope leads downwards to a small room, where a 6-meter crawl continues to the end.

138. Cueva de Sarro, Qro. Three meters west of a major trail in the Barranca el Sarro, 1.8 kilometers northeast of Agua Zarca.

From the 2.5-meter-wide and 2-meter-high entrance, a walking passage slopes down 25 meters to a drain. A side passage goes right as a walking canyon for 30 meters. The cave contains many bats.

139. Cueva de Crucitas, Qro. Uphill through cornfields in an outcrop 300 meters east of the town of Tlacuilola.

From the 1.0-by-0.5-meter entrance in an outcrop in a field, a canyon 2 to 5 meters wide and 12 meters high leads steeply downward. Near the end, a 4-meter climb goes up to 10 meters of passage.

140. Cueva Queso Suizo, Qro. Four hundred meters east of the town of Tlacuilola. From Cueva de Crucitas (number 139), go diagonally uphill to the left. The entrances to Requesón (number 141) and Queso Suizo are near a fence and trail.

From entrance 1, a 3-meter climb-down from a 3-by-1.6-meter opening, one way goes 15 meters and becomes too narrow. The other way goes 7 meters to entrance 2, a stoopway 1 by 0.7 meters.

141. Cueva de Requesón. See number 140.

Entrance 1 is a 0.5-by-0.5-meter triangular slot in a small outcrop. Entrance 2 is a 1-by-0.5-meter hole about 1 meter above and 8 meters to the left of entrance 1. Entrance 2 is a 3-meter crawl that leads to entrance 1, from which 7 meters of passage 6 meters high goes down 2 meters.

142. Cueva de Tlacuilola, Qro. Four hundred meters southwest of town of Tlacuilola. From town, follow flowing stream up about 1000 meters and hike uphill to the left, following a small arroyo to the entrance.

The stoop entrance, 2 meters wide and 1 meter high, is at the top of a 10-meter climb in the arroyo. It leads to a large room, followed by a smaller room and sump pool. There is evidence of vampire bats.

143. Sótano de Moises, Qro. Five meters east of and 3 meters down from the top of a ridge, 1.5 kilometers

northeast of Agua Zarca and 700 meters northwest of Mesa del Jagüey.

The 27-meter pit is 3 by 2.5 meters at the top. Halfway down, an unchecked passage leads off from the pit. At the bottom, a slope leads to a 12-meter-high dome.

144. Sótano de Lorrretto, Qro. Five hundred meters northeast of Agua Zarca, on southwest slope of hill.

The 56-meter pit is 4 by 4 meters and ends at a sump. The pit floods during wet weather.

145. Sótano Brillante, Qro. Twelve hundred meters north-northwest of San Onobre and 2.8 kilometers east of Agua Zarca. On the right (east) side of a major arroyo, 130 meters above the road. Three hundred meters east of a major stream bed and 50 meters left (west) of a concrete water trough.

The entrance is 5 by 6 meters. The entrance pit is 35 meters deep. The second pit drops 57 meters to a bridge. From the top of the second pit, the cave is a canyon with many ledges. The last two drops are 69 meters and 41 meters, making the canyon 180 meters deep. See map and exploration report in *AMCS Activities Newsletter 21*, pages 76-78.

146. Cueva de Tarántula Gateando, Qro. Three kilometers east-southeast of Agua Zarca and 8 meters below Sótano Brillante (number 145), next to a trail.

From the 1-by-0.3-meter entrance, the passage averages 1 meter wide and 1.2 meters high and slopes downward for 40 meters to a breakdown end.

147. Sótano de Graciela, Qro. Three hundred meters southeast of Agua Zarca. Thirty meters above and southeast (140 degrees) of the school that is south of the road that goes to Camarones and San Onobre.

From its 6-by-6-meter entrance, the 54-meter pit lands on a 30-meter-deep slope to a large room 30 meters across and high.

148. Sótano de Victorino, Qro. Above and southwest of the Agua Zarca-La Palma trail, 1.6 kilometers southeast of Agua Zarca.

Two small entrances, one of which had been plugged with rocks and the other of which was dug open by cavers, give access to a 28-meter pit with some nice flowstone on the wall. The floor slopes down to a blind 2-meter hole.

149. Sótano de San Onobre, Qro. One kilometer west of San Onobre and 20 meters vertically below the dirt road.

The blind pit is 58 meters deep, 1.5

by 1 meters at the top, and 5 by 5 meters at the bottom.

150. Sótano de Piedra Parada, Qro. Three kilometers southeast of Agua Zarca; 300 meters west of La Palma. Below and west of the Agua Zarca-La Palma trail. The very obscure entrance is in forest below a 2-meter-high bluff.

The entrance pit is 2 by 1.5 meters at the top and drops 11.5 meters, with a ledge 5.4 meters down. From the room at the bottom, a slope down leads to two domes up to 10 meters high, with a vampire-bat colony, and a small, downward-sloping stoopway leads to a small, decorated room, the end of the cave.

151. Cueva de Geraldo, Qro. On the side of a hill in a 6-by-6-meter sink, 600 meters southeast of the village of San Onobre.

From the 6-meter-wide and 3-meter-high entrance, a 3-meter climb down leads to a 12-meter passage sloping

downward. A tight crawl leads to a small grotto that was not checked.

152. Cueva de Alvaro, Hgo. Three hundred meters northwest of La Peña, 5 kilometers southeast of Agua Zarca. On hillside, above minor jungle above trail from La Peña to San Onobre.

A 6-by-4-meter entrance slopes down to a room and a squeeze to a small room. Signs of vampire bats.

153. Sótano de Tres Ojos, Hgo. Eight hundred meters southeast of La Peña, 40 meters below and east of the Agua Zarca-Pisaflores road. In a rock-walled sink in a cornfield.

Three small holes, about 1 meter square each, in the wooded sink open into a 19-meter pit. There are two small alcoves down a slope from the bottom, the right of which has a small dome.

154. Sótano Reseco, Hgo. One kilometer east of the town of El Petatillo. From road at El Durazno, go down 200 meters to flowing stream and head

down stream on the right side. Entrance is by a fence line at edge of open field, and 150 meters about El Chamirro creek.

A nice, free 36-meter pit with an entrance 2 by 2 meters and a small room at the bottom.

155. Sótano de la Guadaña, Hgo. Ten meters vertically below the top of a ridge, and 1.1 kilometers southeast of the town of El Rayo.

Very small entrance to pit 15 meters deep, with a 3-meter slope at the bottom.

156. Cueva de El Rayo. Nine hundred meters southeast of El Rayo. Six meters above and on the east slope of a hollow.

From the large entrance, 10 meters wide and 6 meters high, the cave slopes into a large room 130 meters wide. This room slopes downward 65 vertical meters to the end. The room is 25 meters high. To the right of the entrance 30 meters is a 8-meter pit with 3 meters of passage at the bottom.

157. Sótano Tapado, Hgo. Eleven hundred meters east-southeast of El Rayo, 65 meters vertically above the San Pedro-El Rayo road. South of the road and 10 meters east of a small hollow; in a small clump of trees. There is a fence around the pit, and it is partly covered by a concrete slab.

The entrance is 2 by 1.3 meters. The 12-meter pit goes to short passages at four levels, but all end within 20 meters.

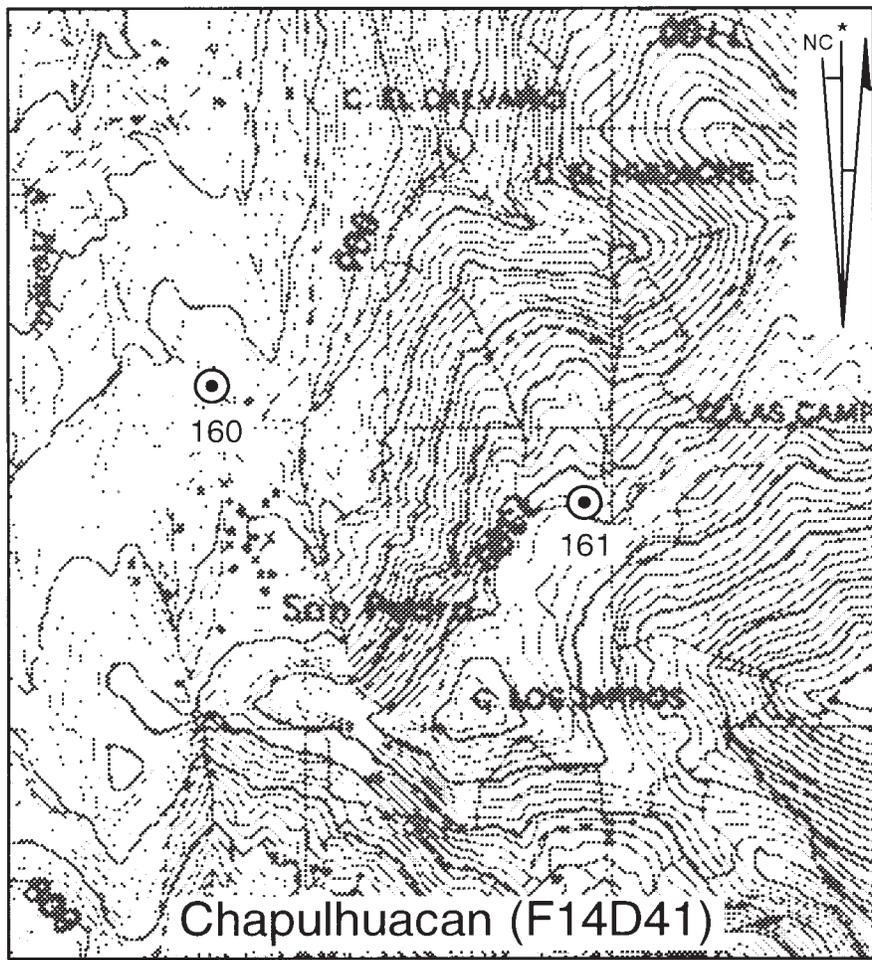
158. Cueva de la Cuesta, Hgo. In the lower part of the town of El Rayo, 50 vertical meters below the main El Rayo-Pisaflores road. In an 8-meter-high bluff 50 meters southeast of a major arroyo that flows through town.

The entrance is 2.6 by 2.6 meters and leads, after 8 meters, to a 20-meter crawl. A first room is 3 meters high, 6 wide, and 12 long. The second room is 5 meters high, 5 wide, and 10 long. There are a lot of bats.

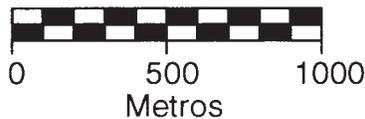
159. Cueva de los Pretiles, Hgo. At the base of a bluff, 10 meters southwest of and 7 meters above the bed of Arroyo Seco, 1.2 kilometers northwest of El Rayo.

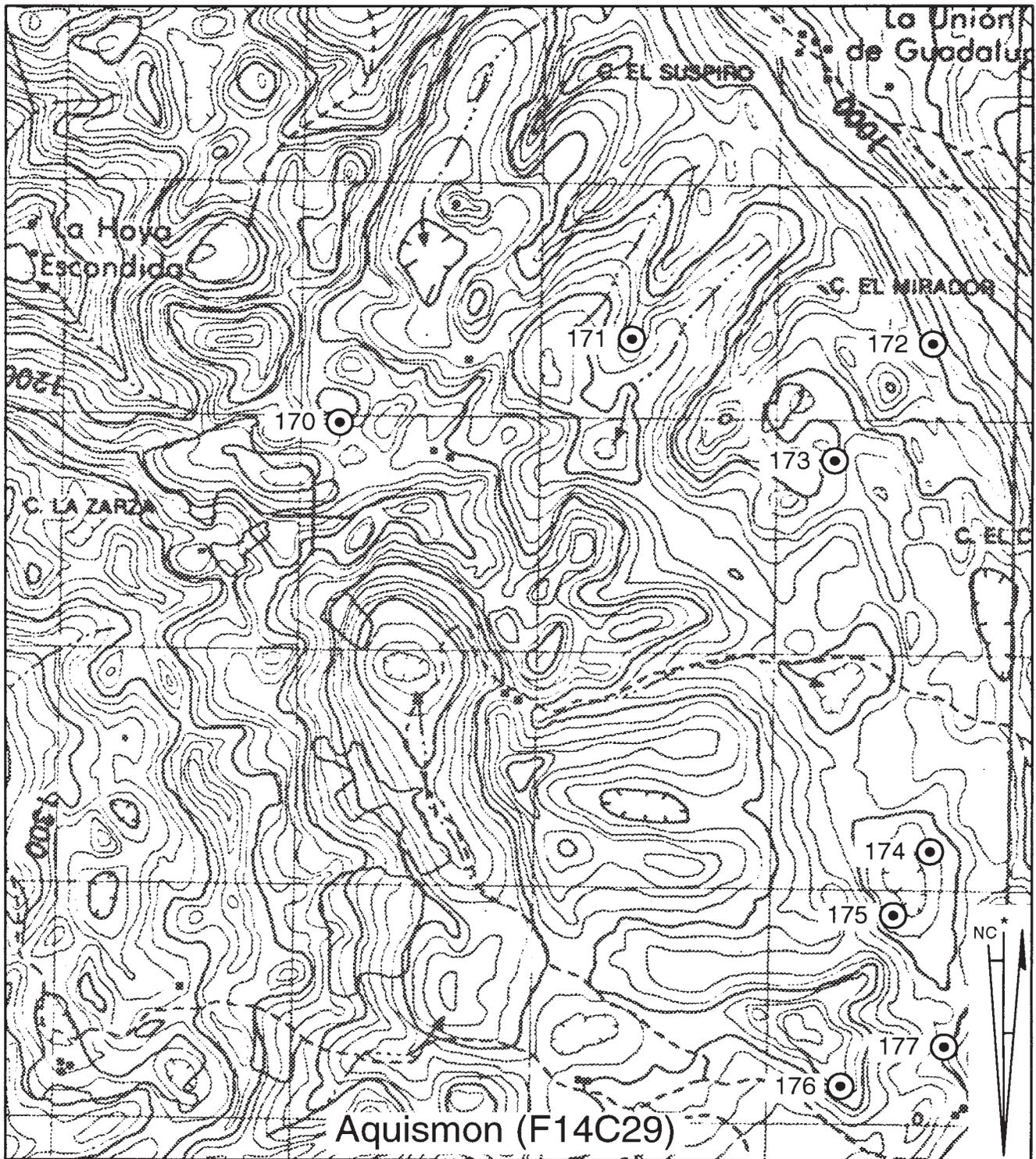
The entrance is 2.6 meters wide and 1 meter high. Ten meters of stooping, 20 meters of walking, and a 3-meter climb up go to an upper passage that goes for 40 meters and gains 12 meters in elevation, ending in a muddy crawl to a sump. The cave is a resurgence in wet weather.

160. Cueva de Xochicoalco, Hgo. Five hundred meters north-northwest

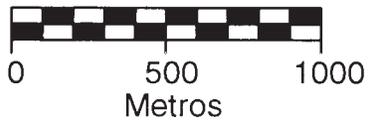


Map 6





Map 8



of San Pedro, 20 meters vertically down from a knob, and 30 meters above and to the west of San Pedro–El Rayo road.

The entrance is 1 meter wide and 2 meters high, and the cave continues as a walking crevice. By staying high, you can reach the end of the cave after 40 meters. A 2-meter climb goes down to a crawl.

161. Sótano de Lonisio, Hgo. On a slope in the jungle, 1.1 kilometers east of San Pedro.

A 7-meter drop from the 3-by-2-meter entrance goes to the top of a passage 1.2 meters high and 1 meter wide that slopes down at 45-degrees to a level floor.

162. Sótano de Cerro Grande, Hgo. On a hill overlooking the village of Cerro Grande from the southeast, 1 kilometer west of Chalahuite. On a steep hillside, 25 meters above first house on left of trail from Las Crucitas to Cerro Grande.

A sheer drop of 85 meters from the 2-by-3-meter entrance to a 2-by-4-meter room at the bottom.

163. Sótano Bailando, Hgo. Five hundred meters southwest of village of Cerro Grande, on the right side of a small ravine off of the major ravine up from Cerro Grande, about 100 meters above the village.

A 27-meter pit from a 4-by-2-meter entrance to a downward sloping passage to the end of the cave. There is a ledge 15 meters down.

164. Sótano las Vidas, Hgo. Four hundred meters southwest of Chalahuite, in a small arroyo at the edge of a field above the Chalahuite-Caracol trail. Ten meters vertically above and 20 meters to the left of an obvious 12-meter sink visible from the trail.

From the 2-meter-diameter entrance, a 5.5-meter climb down leads to a small opening into a 29-meter pit, at the top of which someone has placed some eyebolts. From the bottom, a 2-meter climb down leads to a 30-meter rift, sloping 2 meters downward to a 5.5-meter climb down to a short slope and a 4.5-meter climb that really should be rigged. Another 20 meters of passage leads to a 5-meter pit, immediately followed by a 15-meter pit. From here, the cave is larger, and it slopes steeply downward, losing 28 meters in elevation to the top of a 6.5-meter pit, beyond which more slope leads to a large dome room 16.5 meters lower. Crawls and climbs down through very unstable breakdown lead to Death Chamber. Lots of wind, but very dangerous.

165. Cueva de Marcelina, Hgo. Five hundred meters south of Chalahuite, in an arroyo 100 meters uphill (north) of the main dirt road. Below the Caracol-Chalahuite trail.

The entrance is 5 meters wide and 6 meters high. The walking passage goes 15 meters to a 16-meter pit, from the bottom of which a crawl goes 6 meters to a canyon passage. The top of the canyon goes 20 meters to the second pit. In this part of the cave there is lots of airflow, and there may be passage across the second pit, which is 12 meters deep, to 20 meters of passage to a mud plug with no air. The cave takes water during rains.

166. Cueva de Chalahuite, Hgo. One kilometer southeast of Chalahuite, 10 meters west of dirt road. There is a building and a pole with transformer beside the entrance.

The entrance sink contains pumps and pipes that supply water for the town of Chalahuite. The entrance is 5 meters high and 2.5 meters wide. Twenty meters inside, there is a concrete water tank. Fifty meters beyond, a short right-hand passage goes to a crawl, and beyond that a passage to the left goes to a high dome where water is collected. The main passage continues steeply downward, 6 meters wide and 8 meters high, to a gravel-filled end. Very strong airflow disappears shortly before the end.

167. Sótano de Dometilo, Hgo. Entrance faces out of hill at 140 degrees, 250 meters vertically above and 650 meters northwest of Caracol.

A 29-meter blind pit, 3 meters in diameter at the top and 25 by 12 meters at the bottom.

168. Cueva del Caracol, Hgo. On the northwest side of a large sink shown on the top, 1.3 kilometers southeast of Caracol and below the dirt road. The entrance faces 110 degrees.

From entrance 15 meters wide and 5 meters high, a sloping passage goes to a room 15 meters high and wide. Up a slope at the end of this room, a crawl goes to the right to a room 30 meters long and 7 meters high. There were two test pits for phosphate mining.

169. Cueva de Trejo, Hgo. A crack in the karst on the southeast side, facing 240 degrees, of a sinkhole shown on the topo 1.5 kilometers southeast of Caracol.

Tight climb-down entrance 1 by 0.6 meters to a small crawl to a 1-meter-wide, 2.5-meter-high walking canyon passage with nice formations. After 120

meters, it becomes too narrow.

170. Cueva de Cuguixtle, SLP. In a large sinkhole 5.3 kilometers northwest of Tamapatz and 1.5 kilometers southeast of La Hoya Escondida.

One large room, sloping down from a 25-by-25-meter entrance to a level floor. The room is up to 35 meters wide and 30 meters high.

171. Cueva de Soyamiches, SLP. On the northwest side of a major sink, 2 meters northwest of a trail. Fifteen hundred meters southwest of La Union de Guadalupe, 4.3 kilometers northwest of Tamapatz.

From the 4-meter-wide and 3-meter-tall entrance, a breakdown slope was explored for 25 meters and continues.

172. Cueva de Arena, SLP. Two kilometers northwest of Sopope, 500 meters southeast of Cerro el Mirador, 3.7 kilometers northwest of Tamapatz, on northeast side of a hill.

The main entrance is 3 meters wide and 2.5 meters high, and there is a skylight entrance 2 meters above it. Walking passage goes 10 meters to a 27-meter pit, with a small pool and a 16-meter-wide room at the bottom. A climb up at the lip of the pit goes 15 meters and ends. A map appears elsewhere in this issue.

173. Sótano de Dar Gracias, SLP. In the jungle 10 meters vertically down from the top of a hill; 3.6 kilometers northwest of Tamapatz and 2.2 kilometers northwest of Sopope. The hillside entrance faces north.

A stair-step pit 45 meters deep, with ledges at 9 and 29 meters. The top is 2.5 meters wide and 6 meters long, and the bottom is 5 by 6 meters, with no leads. A map appears elsewhere in this issue.

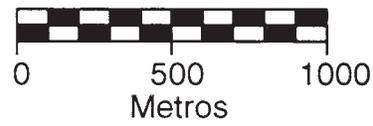
174. Hoya de Guadalupe, SLP. In a large sinkhole valley 2.6 kilometers west and slightly north of Tamapatz. The sótano is in the northeast side of the bottom of the sink.

The entrance shaft is 15 by 15 meters at the top and drops 84 meters. The pit funnels on down. To avoid rockfall, climb up and around to the far side of the funnel to a bolt and natural anchor. Rappel 15 meters and feed the rope through a natural bridge, from which rappels of 21, 16, 14, and 61 meters lead to a big room, at the bottom of which a tight crawl leads to a 10-meter pit to the end. Further description and map appear elsewhere in this issue.

175. Cueva de Guadalupe, SLP. In the southwest side of a large sinkhole valley 2.6 kilometers west and slightly



Map 9



north of Tamapatz.

A shelter with an entrance 15 by 15 meters, sloping down 8 meters to the end.

176. Cueva de las Golondrinas, SLP. One kilometer northeast of Campeche and 2.7 kilometers west and slightly south of Tamapatz. The large entrance is easily seen on the left on the main trail north from Campeche, near the top of the ridge.

Just inside the 25-meter-high, 15-meter-wide entrance is a large dome-pit, 25 meters wide, 65 meters long, and 40 to 80 meters high, with a drop of 29 meters to a floor that slopes downward another 40 vertical meters. To the left at the bottom is 40 meters of passage trending up.

177. Sótano de Octufu, SLP. On the east side of a major trail that comes from Campeche. Six hundred meters northeast of Cueva de las Golondrinas (number 176), 2.3 kilometers west of Tamapatz, and 850 meters north and slightly west of Campeche.

The main entrance is 5 by 10 meters. A second entrance, separated by a natural bridge, slopes into the pit, which drops 125 meters to a floor 30 meters across with two small rooms to the side. From a ledge 59 meters down on the southeast side of the pit, a parallel, sloping pit drops 139 meters. Its floor slopes downward another 20 meters vertically, to where a small hole leads about 3 meters down to a low, small room. The water leaves through a low space above silt fill. Further description and map are elsewhere in this issue.

178. Cueva de Mejia, SLP. Fifteen hundred meters southwest of Tamapatz. The cave is 130 meters above and at a direction of 270 degrees from well-known Sótano de Cepillo.

The 15-meter-wide and 5-meter-high entrance opens into a room 25 meters wide and 30 meters long. Further description and map are elsewhere in this issue.

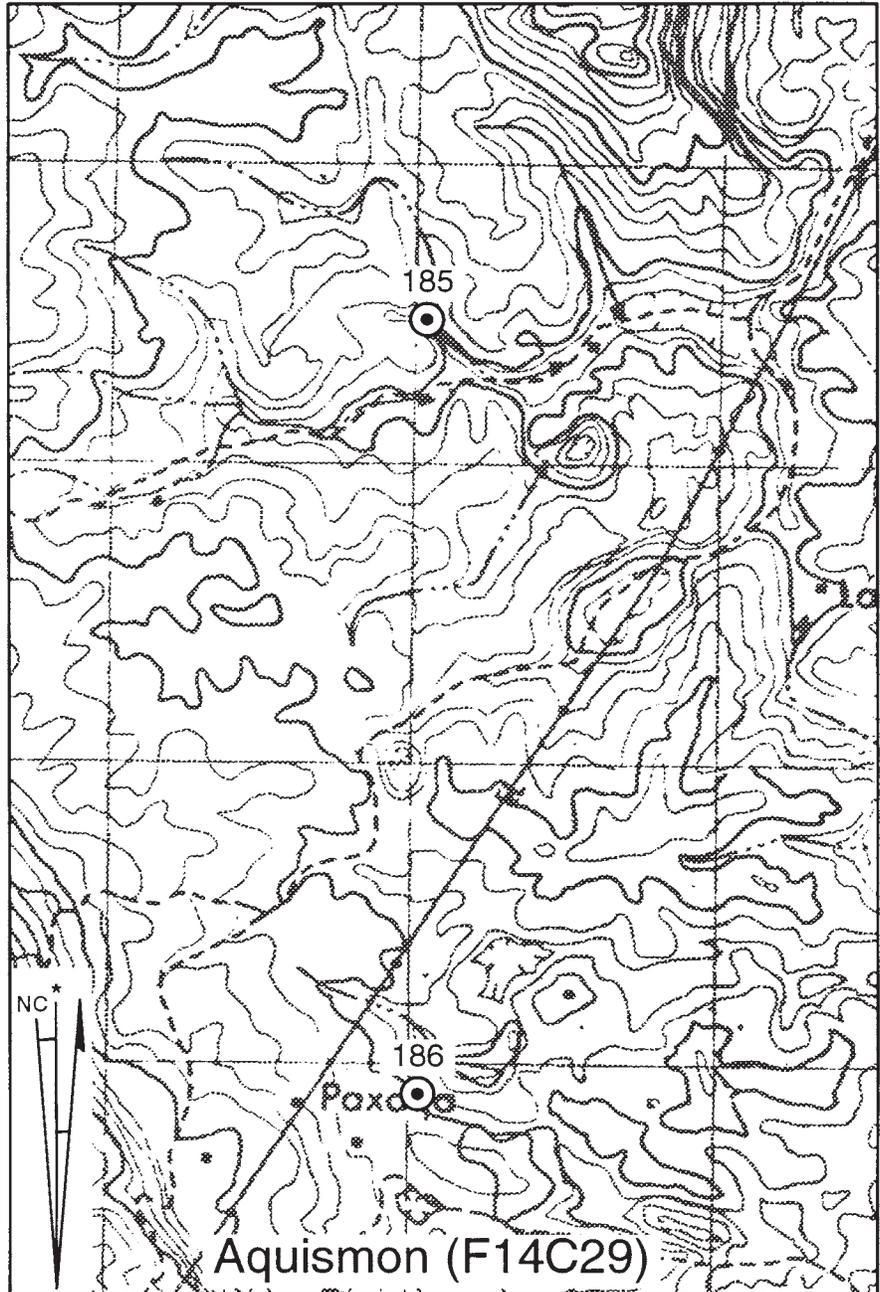
179. Sótano de Mejia, SLP. Three hundred meters east of the Tamapatz-Agua Amarga trail, on the south slope of Cerro La Palma, 2 kilometers southwest of Tamapatz.

The entrance to the pit is 15 meters long and 5 meters wide. A natural bridge divides the pit a few meters down. From the rig-point on the downhill side, the drop is 52 meters, with a ledge 17 meters from the bottom, a large room that slopes down to a tight crawl that ends. Further description

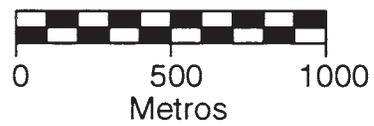
and map appear elsewhere in this issue.

180. Cueva de Caracol, SLP. In the northeast of the bottom of a sinkhole valley shown on the topo map and locally called Caracol, 10 meters west of a trail, downhill and south of the village of Agua Bendita, and 250 meters northeast of Cueva de Muchas Columnas. The cave is 3.1 kilometers southwest of Tamapatz.

The entrance is 12 meters wide and 1.5 meters high. The main passage, 3 meters wide and 1.3 meters high, slopes downward 40 meters to a waterfall room. There, a crawlway to the left goes 20 meters, and a 20-meter passage to the right loops back to the main passage. The water drops down a 6-meter pit to a room 6 meters across, where it disappears in the breakdown floor. Further description and map



Map 10



appear elsewhere in this issue.

181. Cueva de Muchas Columnas, SLP. Twenty meters above the bottom of a sinkhole valley (see number 180), on the southwest side, in a sinkhole 10 meters deep and 30 meters across. Two hundred fifty meters southwest of Cueva del Caracol (number 180), and 3.2 kilometers southwest of Tamapatz.

The main entrance is 10 meters wide and 5 meters high. A 6-meter slope leads to a large room 25 meters wide by 10 meters high. A second entrance, 3 meters wide and 8 meters high, goes 5 meters to an 8-meter pit that drops into the same room. At the end of the entrance room, a 5 meter climb up over flowstone leads to a room 120 meters long and 30 meters wide, filled with large formations and with a floor completely covered with flowstone and rimstone dams. Further description can be found elsewhere in this issue.

182. Cueva de Anita, SLP. Six hundred meters south of the village of

Muhuatl, 20 meters upslope and southwest of a dirt road in a field; 2.3 kilometers south of Tamapatz.

The crawlway entrance, 0.8 meters high and 0.5 meters wide, goes 10 meters to a 2-meter climb down into a room from which two passage loop around and join after 10 meters. The room and looping passages are 4 meters high.

183. Cueva de Vallo, SLP. Seven hundred meters south of the village of Muhuate, 200 meters west (uphill) from the dirt road; 2.4 kilometers south of Tamapatz.

A stoop entrance 1.5 meters high and 4 meters wide goes to a 3-meter-high walking passage that turns right and ends.

184. Cueva de Santiago, SLP. In a 7-meter-high bluff in a coffee field, 300 meters west of the dirt road at the village of Tunuim. Twelve hundred meters south-southwest of Muhuatl and 3.2 kilometers south of Tamapatz.

The crawlway entrance, 1.5 meters wide and 1 meter high, goes 2 meters to a passage 100 meters long, 15 meters wide, and 7 meters high.

185. Cueva de Infierno, SLP. On the north slope of a small valley, 20 meters north of the road from Aquismon, 1.6 kilometers northwest of village of La Laja, 3.8 kilometers north-northeast of Tamapatz.

The 12-meter-square entrance passage goes 12 meters to a 5-meter crawl that leads to a room 10 meters long, 8 meters wide, and 5 meters high.

186. Pozo de Deseos, SLP. On the south side of a large sink, just northeast of the town of Paxalja, 1.6 kilometers northeast of Tamapatz.

The cliff entrance is 6 meters wide and 2 meters high. Despite its horizontal appearance, it opens to a pit 75 meters deep, with a 30-by-12-meter room at the bottom. A map appears elsewhere in this issue.

*Take Nothing But Pictures
Leave Nothing But Footprints
Kill Nothing But Time*

EXPLORATION IN THE SIERRA MADRE ORIENTAL, SAN LUIS POTOSÍ

James H. Smith

The Xilitla Project extended its search for the big one into the Sierra Madre near Tamapatz, San Luis Potosí, in February 1995. The expedition was led by Gerald Moni and was fielded in response to discoveries made during the Christmas 1994 project trip. We assembled in the Huasteca Indian town of Tamapatz, near Ciudad Valles on the Inter-American Highway. Our team was only five. Besides Gerald, from Nashville, Tennessee, it consisted of Marion O. Smith, from Knoxville, Tennessee, and John Stembel, Teresa Williams, and me from Atlanta, Georgia. In Tamapatz we rented the garage at a hotel in the town to set up tents, but we were ultimately driven out by gasoline fumes. Nevertheless, access to showers was worth the fifty pesos we paid for the garage. But I wouldn't say the same for the toilets. Security for our vehicles and equipment was no problem, as the people in the community appear to be extremely honest.

Caving actually began for John and me the day before, February 18, 1995, after we had recovered six hundred meters of rope from our depot in the Xilitla highlands forty kilometers to the south. We explored a roadside cave called El Pozo, which means the well. The first drop we rigged and descended is 20 meters deep. This could have been bypassed by negotiating a treacherously steep slope in the entrance. Within sight of daylight is the 115-meter-deep pit. We tied off our 180-meter rope to a large slab, and John drilled a bolt hole on a ledge to improve the rigging. I descended first down the sheer wall of the shaft. I could touch the wall

all the way down, except for the last 12 meters. After touring less than 30 meters of passage at the bottom, I climbed up the shaft without using my light. A brilliant ray of sunlight beamed across the top of the shaft. As I neared the top, the bright spot looked similar to the silhouette of a bat, like the Batman symbol. After we had both descended and climbed both drops, we drove one thousand meters vertically down the mountain to the foot of the range at an enormous spring, the Nacimiento Huichihuayán. After a refreshing swim, we drove through extensive orange groves in full flower. The sweet smell of orange blossoms and jungle flora marked the beginning of spring south of the Tropic of Cancer. Three hours and five kilometers of rough dirt roads later, we arrived in Tamapatz.

On February 20, 1995, our first objective was to hike west of the town a straight-line distance of 1.5 kilometers to a cave named Hoya de Guadalupe. It doesn't sound too far to walk, but five hours later we were lost among deep dolinas and towering hills of cone karst. Our guide, Juan Mejia, whom we paid forty pesos a day, had not been to the area since he was a boy. Fortunately, Gerald's Global Positioning System unit indicated we were only 750 meters from the cave. The look of exhaustion on the faces of the team members and the guide indicated that Gerald's declaration was of small consequence. But we shouldered our heavy loads and eventually found a trail Gerald recognized. We followed a faint trail down the side of a dolina through

an open field, into a sugar-cane field, and then into dense jungle. We eventually arrived at the edge of a 30-meter-diameter pit. Rock-fall times indicated that the pit was about 100 meters deep. Gerald's team had descended the cave to the end of a 180-meter rope in December. Below their final point was a 4.5-second pit.

We rigged the entrance pit with a 90-meter rope. John descended first and yelled, "Off rope." In an attempt to improve the rigging, I shortened the amount of rope in the pit and left myself 8 meters off the floor. Fortunately, I had another rope with me. Marion rerigged the rope again, so that there was a meter on the bottom. Meanwhile, John had climbed 8 meters up a large rock to reach the other side of the main shaft. At the bottom of the entrance shaft, the floor sloped steeply down a dangerously loose scree pile to the next drop. We did not want to rig down the slope because of the avalanche potential. John rigged a rope down the boulder and a safety to the other side of the pit.

Marion and Gerald descended the entrance shaft, while John set a bolt and a sling to rig the next drop. Gerald then climbed out of the pit, and Teresa descended. After snaking a 180-meter rope down the hole, John descended 15 meters to the next rig point, where he rebelayed the rope from a sling looped around a natural bridge. On the bottom, he yelled, "Off rope," and emphatically warned me not to dislodge any rocks, as he could not escape from rock fall. Below the rebelay, I passed several ledges covered with loose rock. After descending 35

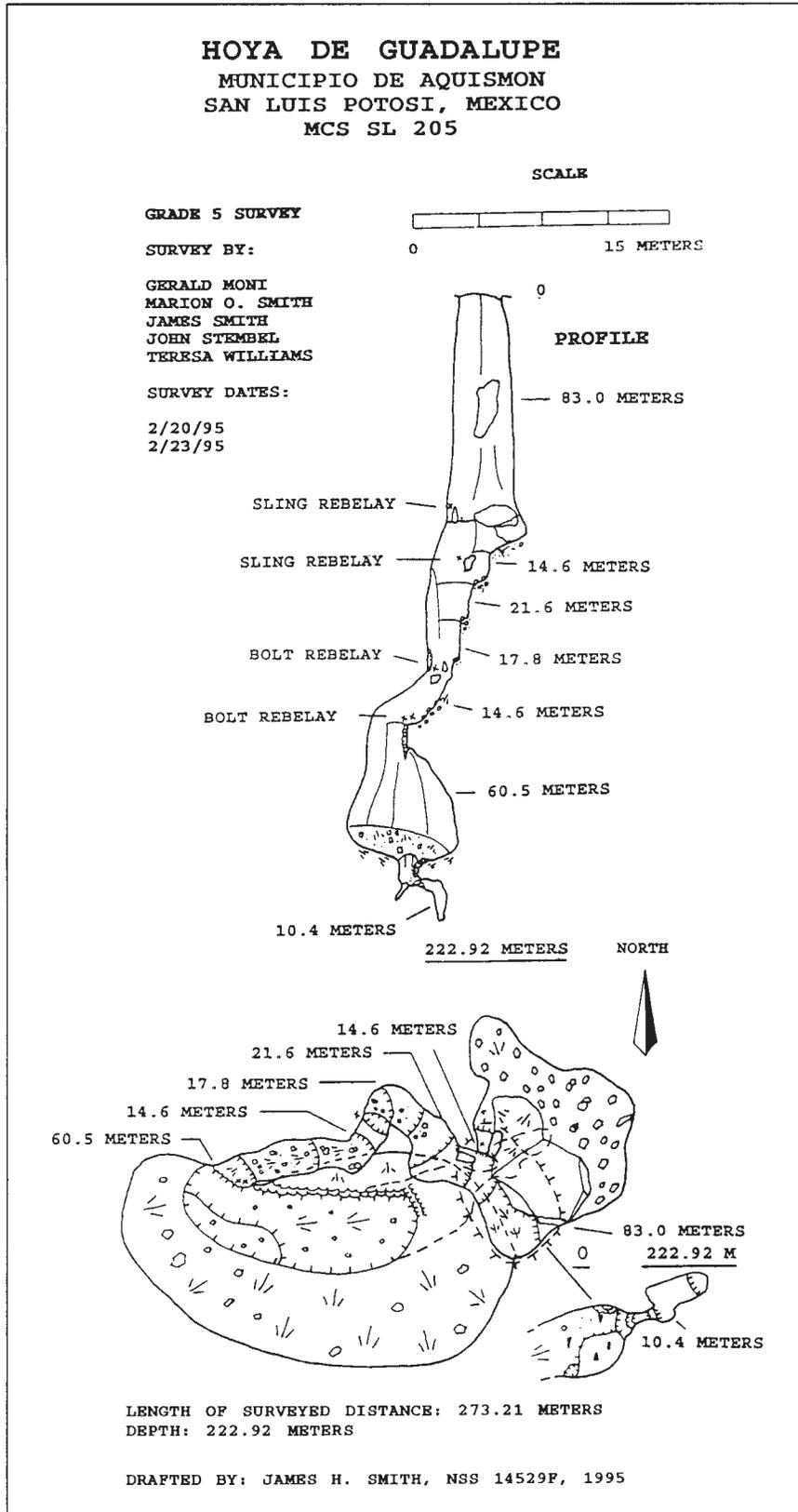
meters, I joined John. I helped him rebelay the rope and redirect 130 meters of rope down a parallel hole. I set an 8-millimeter bolt, tied off

the rope to a Quick Link, and descended 8 meters to a steep slope covered with loose rock. I backed down the slope, sending a cascade

of boulders down the next shaft, 8 meters down the slope. After cleaning the most unstable portion of the slope, I descended to a ledge overlooking the pit. A rock drop of 4.5 seconds indicated that we were at the end of previous exploration. I set another anchor and descended the 60-meter-deep shaft. This pit is 8 meters in diameter for 20 meters, and then the walls disappear. The pit bells out into a 60-by-30-meter chamber. Near the bottom of the pit, it narrows to an 8-meter-diameter hole passing through the floor of the big chamber. It would require a technical climb to reach and explore the floor of the chamber. When I reached the bottom of the drop, there were only 30 meters of rope left. John, Marion, and Teresa followed me. We hammered open a small hole to another shaft. Marion barely fit through the hole, but he descended 10 meters to a tight, narrow canyon and a final 3-meter climb to the bottom of the cave. We surveyed this part of the cave so we would not have to descend the tight pit again. We saw several tarantulas on the floor.

Dehydrated and thirsty, we left the cave, vowing to return to complete the survey. A closer look at the floors and walls revealed a thriving population of troglobitic insects and worms. These creatures were white to clear and did not have eyes. The worms were white to clear and iridescent under our bright white lights. After 5 hours in the cave, the last person climbed to the surface. We found Gerald and our guide huddled around a fire in the dark. After coiling the entrance rope, we headed back to town. It took only 1.5 hours to hike back.

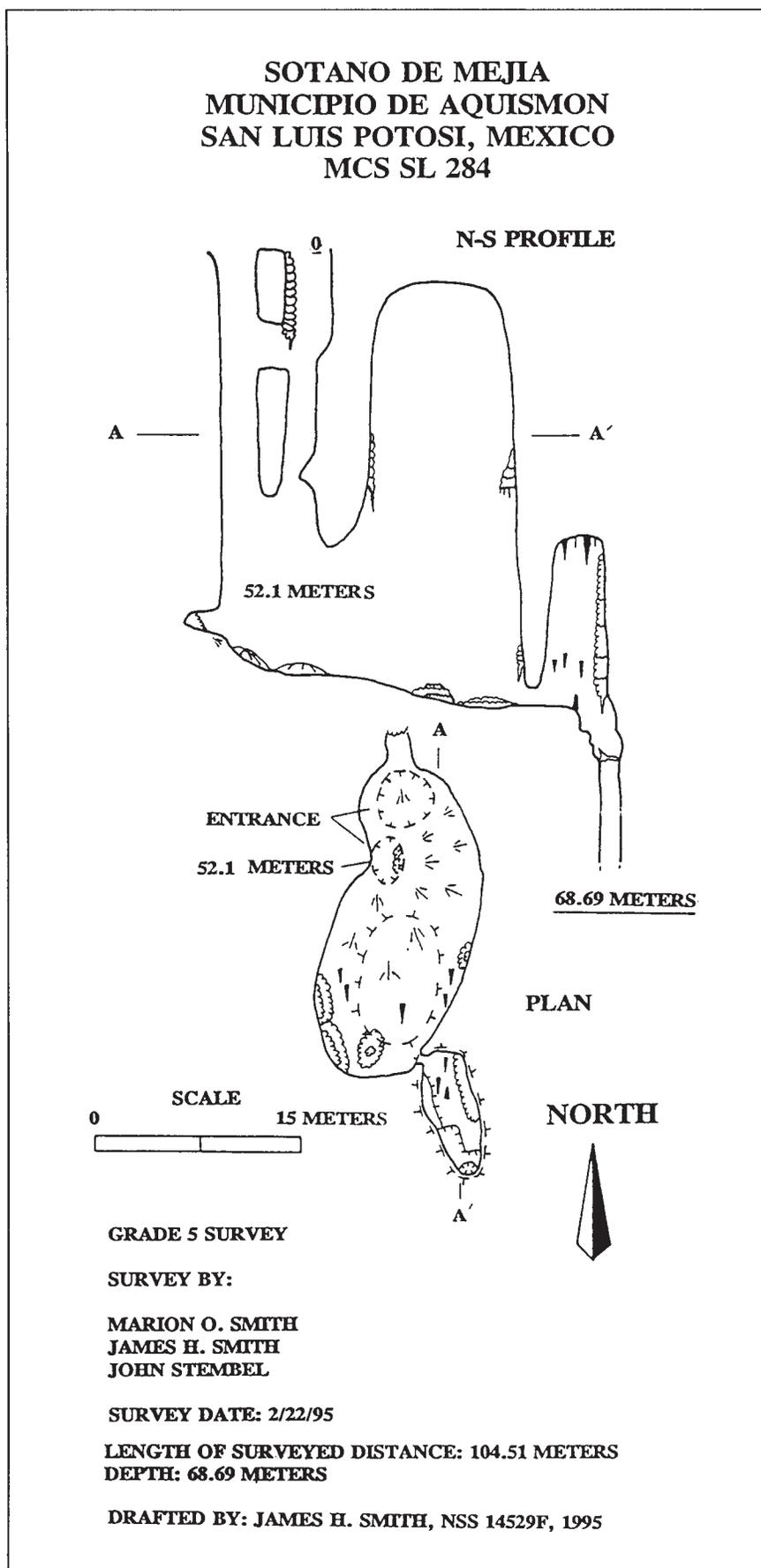
The next day we drove the dirt road to the end, and along the way we stopped to ask for cave locations at every village we passed. We were told of big caves that would require long walks to reach. We would return on a future trip to visit those areas. Two caves were entered that day, although they are for the record only and not worth describing. The longest was 18 meters, explored by Marion, Gerald, and Teresa.



On the twenty-second, Juan took us to a large dolina called Caracol. Gerald had found a cave entrance 8 meters wide and 1 meter high with a lot of wind during the December expedition to the area. Once in the dolina, we could not seem to find the entrance. Of course the guide had never been to the cave. Gerald claimed his GPS unit indicated we were on top of it. But he also said, "You know, there is a random error of a hundred meters or more. We could actually be in the wrong area." At any rate, the guide talked to a farmer who showed us another cave. This cave has an entrance that is 12 meters wide and 4 meters high. Within sight of the entrance is a huge flowstone that covers the entire back wall of the entrance chamber. Marion and John went to the left and I to the right, each up steep flowstone into separate chambers. My passage ended quickly, so I retraced my steps and joined the others, who were dazzled by what they had found. So was I. The cave had opened up into a large chamber that was divided by massive columns. The floor was covered with massive flowstone, and the ceiling was festooned with stalactites, soda straws, and even a large shield. We saw about 250 meters of passage. The cave was named Cueva de Muchos Columnas. I wanted to survey it, but the others wanted to do the cave Gerald thought was going to be a thousand meters deep. Begrudgingly, I left with them, marveling at our find.

Finally, we found Cueva de Caracol. Just inside the entrance, the passage followed the dip of the bedding as a tube averaging 1 to 1.5 meters in height and 4 meters in width. We had put on all our gear, expecting to be in the cave for some time. Twenty minutes and one blind 6.5-meter pit quashed our hopes for the big one. We surveyed the cave to a depth of 18 meters and a length of 90 meters, including side passages.

Our guide said he would take us back to Tamapatz by a different route and show us a sótano that was "muy hondo," or as deep as Sótano Cepillo, a 126-meter pit. The pit was off the main trail, near a



house on the edge of a small banana plantation. The residents came out to watch as we approached the pit. The vertical shaft appeared to have two entrances. We dropped a rock and determined that the pit was in the 60-meter range. We rigged the smaller of the two entrances, about 6 meters in diameter. Gerald named the pit Sótano de Mejia after our guide. Marion and John descended the pit, which was measured to be 52.5 meters deep. The bottom of the pit is 30 meters long and 8 meters wide. The other entrance pit connected to the same bottom and looked like a nicer rappel. The survey was taken across the pit and down a crawlway to a parallel 25-meter dome and a climbdown of 5 meters to where the cave became too tight. The depth of the cave is 69 meters.

The next day we returned to Hoya de Guadalupe to survey and derig the cave. The hike took just over an hour, compared to the five-hour death-march of three days before. The survey crew consisted of Marion, Teresa, and me. John stayed on the surface as rope guard, since there were four Indians 200 meters from the entrance manning a sugarcane press. Most of such presses I have seen were powered by burros. Here, the four turned the press by walking in circles all day. They were making casts of brown, crystalline sugar. They appear to be intoxicated, and we were concerned about leaving the rope unguarded. A good nylon rope is highly prized in the area, and the Indians might think an untended rope is a gift from God. Meanwhile, Gerald and Juan had gone to a new area several kilometers on into the range to look for new entrances.

Marion and I dropped the last 60 meters, while Teresa waited on a ledge for Marion and me to survey up the drop. We tied in to the earlier survey and taped the drop at 60.9 meters. We moved slowly up the shafts and exercised great care to avoid dislodging rocks. I was last in line, as I was the book man. Marion and Teresa did a good job and knocked only a few rocks down the shaft while they ran the tape. I derigged the hardware and slings

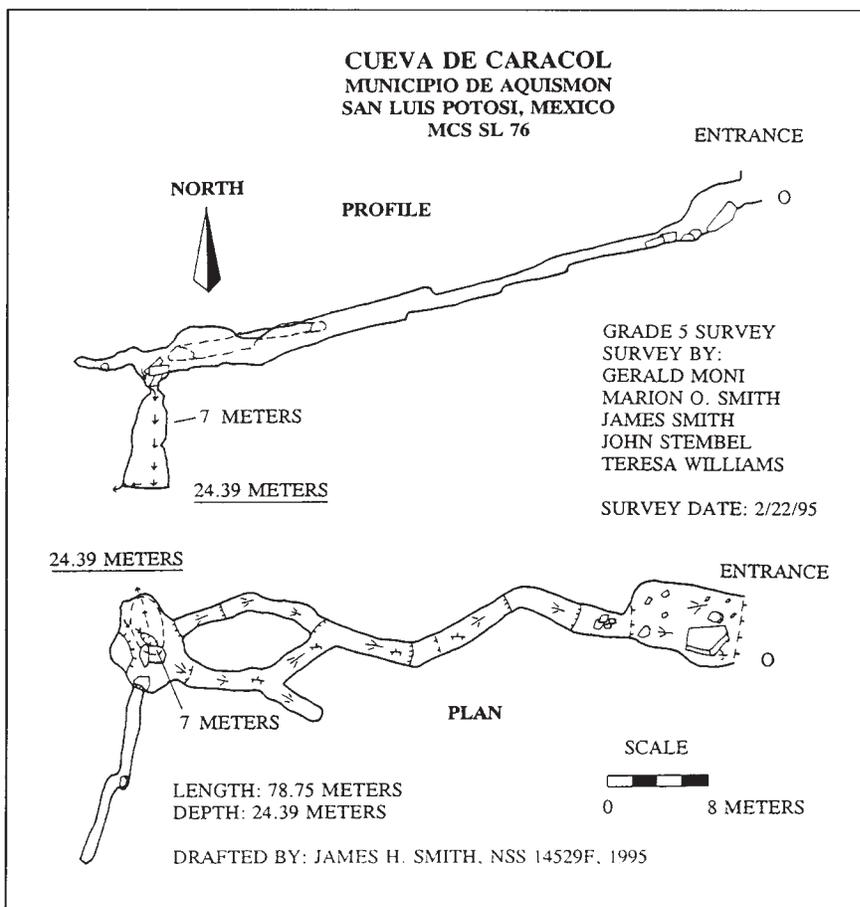
and set up the ropes for a smooth pull up the shafts. We pulled the 180-meter rope up to a large ledge below the 83.5-meter entrance drop and tied all the ropes together for hauling to the surface. After six hours in the cave, I climbed over the lip of the entrance shaft. John and Gerald pulled all of the ropes to the surface.

On February 24, after visiting Sótano de Octufu, which is discussed further below, we headed to the United States, spending the night at the Nacimiento Mante. The late Sheck Exley had dived this spring to a water depth of 264 meters.

During Thanksgiving week 1995, Gerald Moni led a large team of cavers back to the same area in search of deep pits and caves. The team was composed of Paul Aughe from Florida, Chris Hudson from Alabama, Ted Wilson, Arron Green, and Chris Schotter from Indiana, Jim Hewett, Jack Thomison, and Shane Synder from Tennessee, and

Teresa Williams, John Williams, Maury Bemany, John Stembel, Alan Cressler, Leo Romanowski, Jeff Dilcher, Mike Dickerson, and me, Jim Smith, from Georgia.

Prior to meeting up with Gerald, on November 19 Aughe, Hudson, Stembel, Cressler, Romanowski, Dilcher, Dickerson, and I drove to Tamuín to explore Ventana Jabalí, an El Abra classic. We drove to the foot of the range and parked on a gentleman rancher's land. We hiked up 230 vertical meters to the 30-meter-high and 20-meter-wide entrance. We could see the window-like entrance from 8 kilometers away. Leo waited for us at the entrance as we climbed another 165 meters by literally clinging to cactus, finger-holds, and tree limbs all the way to the skylight entrance. There was no trail into this spooky landscape. The escarpment and waterless plateau are a true wilderness, the home of scorpions, spiders, coral snakes, fer de lances, rattlesnakes, and the dreaded tick. We might have found the pit on



our own, but we were thankful to have a guide to lead us right to the entrance. At the skylight entrance, a tremendous draft of air blew out, sending dirt and leaves spiraling into the air. We rigged my twenty-year-old Blue Water III rope, and each of us dropped 153 meters into the enormous passage that is up to 150 meters high, 50 meters wide, and 600 meters long. What a rush! John had the thrill of being the last person down. In poor Spanish we had to convey to our guide that once John was off rope he should untie it and drop it. This would avoid our having to climb back up and pack the rope down the treacherous escarpment. John said he worried as he backed over the edge whether the guide had understood his instructions. He certainly did not want the guide to untie the rope while he was on rappel.

On December 23, 1994, Gerald Moni and Cecile James were taken to a sótano that was thought to be "muy profundo," according to their guide. The locals ought to know, shouldn't they! After two hours of hiking along muddy trails, with stones placed to improve the footing up and down haystack-
John Stembel on the 125-meter drop in Sótano de Octufu.
Jim Smith.



karst hills, the team was led to a house nestled among coffee trees and banana plants high on the mountain ridge. Less than 20 meters from the house is a 15-meter-diameter shaft that was completely hidden from view by a thick grove of mala mujer trees and other dense vegetation. A rock-fall time of 5 seconds indicated the shaft to be around 130 meters deep. Gerald did not have a long enough rope to rig the deep pit, so a return trip was in order. The pit was named Sótano de Octufu for the community of Octufu. Well, that is Gerald's spelling of his pronunciation. No telling what the real name of the community is.

Explorers returned on December 26 with a 182-meter rope. Jim Gamble picked the side of the pit that seemed most convenient, tied the rope to a large ortega tree, and lowered it into the pit. The pit was described as an elongated shaft 60 meters long by 30 meters wide, divided in the middle by a partition. From the rigging point they chose, they were not able to easily reach the top of the partition, which was 7 meters from the rope. Jim and Gerald descended the pit and estimated the depth to be 130 meters. On rope, 60 meters above the floor of the pit, they could look across the top of the partition and see into a black void. Since the pit was discovered at the end of the trip, no further exploration was conducted.

On February 24, 1995, John Stembel, Marion O. Smith, Teresa Williams, Gerald Moni, and I descended Sótano de Octufu. From the lip of the pit, I descended 13 meters of wall until the shaft belled out to its 60-by-30-meter dimensions. We surveyed the perimeter of the shaft and taped its depth at 125



Teresa Williams prepares to descend into Sótano de Octufu.
Jim Smith.

meters. We did not have time to descend the other side of the partition.

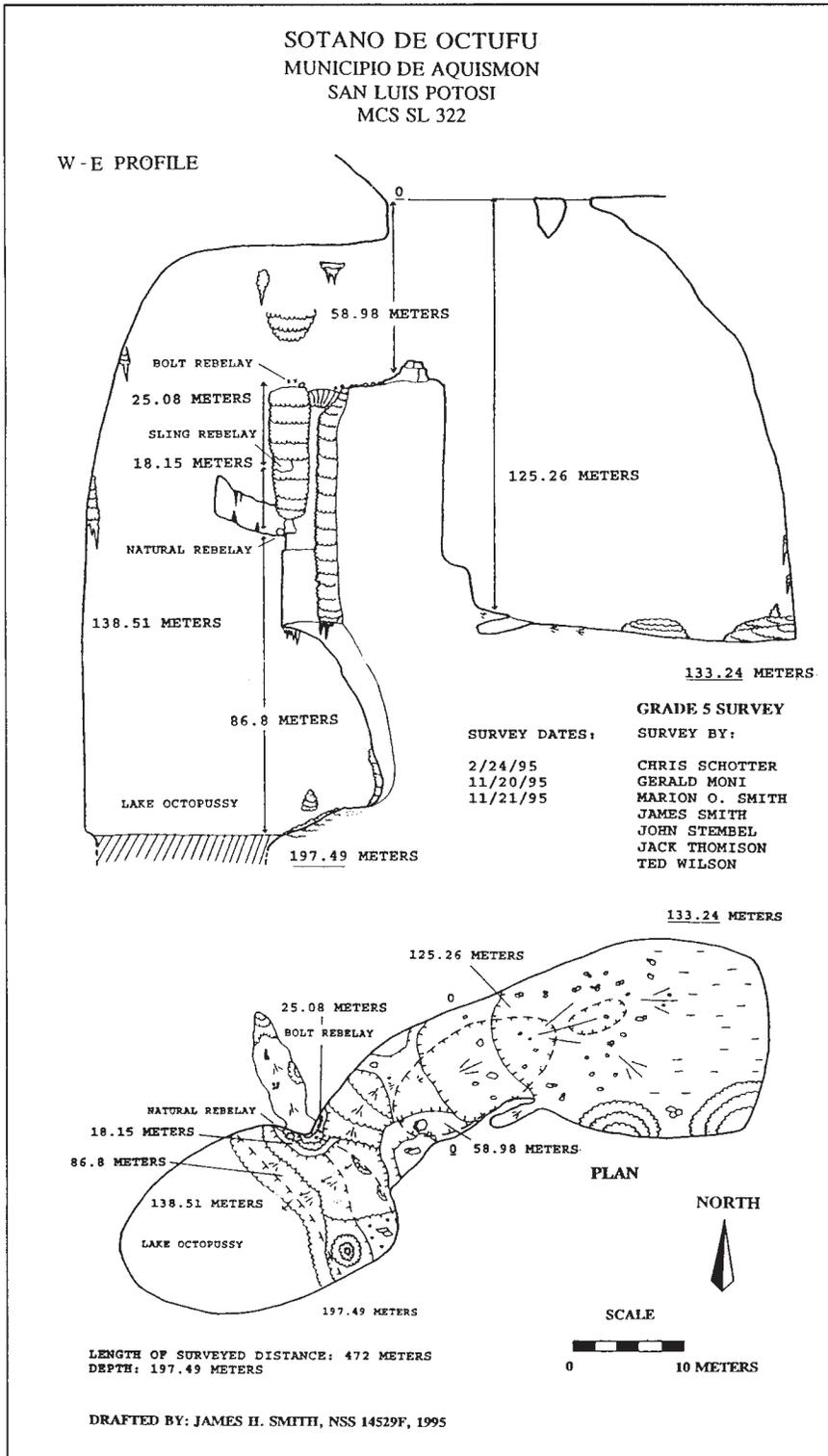
The exploration of Sótano de Octufu was continued on November 20, 1995, by Jim Hewett, Ted Wilson, Shane Snyder, Jack Thomison, Arron Green, Chris Schotter, and Gerald Moni. They rigged the opposite side of the shaft, which placed the rope closer to the partition. Jim rappelled first and swung over to the partition, where he tied off the rope so the others could reach the 5-meter-wide and 13-meter-long saddle between the walls. From the saddle, a rock falls for 5 seconds, indicating another 130-meter shaft. Rigging was going to be a problem because of the rock-fall potential, so Jim climbed on belay across the pit for 8 meters to a ledge and rigged a traverse line. The traverse could be negotiated by climbing or as a tyrolean. Ted followed Jim and set two bolts into flowstone. Satisfied with the bolt placements, Ted padded the twenty-year-old Blue Water III and descended down the shaft. At 25 meters, he swung into an alcove on the wall and rigged a sling rebelay. This broke up the drop and minimized rope rubs. Ted padded the

rope on the rough flowstone wall, dropped another 18 meters, and swung onto a large ledge. After Ted tied off the rope to a large boulder cemented to the floor by flowstone, Jim descended to the ledge. Ted then descended another 5 meters to look over the lip into a huge

black void. The lip was too sharp for the rope, and Ted was fresh out of rope pads. Discretion is the better part of valor, and Ted chose to return with the appropriate equipment. This was fortunate for me, as I was to get my chance at the shaft. On the twenty-first, Ted, Jim,

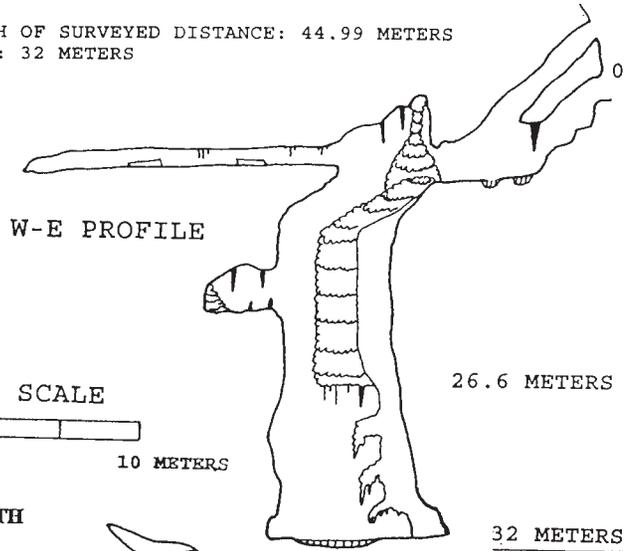
John Stembel, Jack, and I returned to the shaft. John and Jack volunteered to survey while Jim, Ted, and I rigged the pit. It was decided that, since I had brought the bolt kit, I would descend first and rig rebelay as needed. On the ledge above the virgin expanse, I pulled up the rest of the rope and tied a 51-meter PMI onto the end. Jim caught up to me, and then I descended to the breakover and placed two pads on the lip. I could see down the black abyss, and my light reflected off a large pool on the bottom. The pit looked about 90 more meters deep. Eight meters lower, I placed a pad on the rope to avoid abrasion on a small ledge. Ten meters below the ledge, the walls disappeared, and the shaft enlarged to 20 meters in diameter. After 60 meters free, I landed at the edge of the 15-meter-diameter lake, at the end of the 167-meter rope. The clear water in the lake looked very deep. I could see no continuation of the cave on the distant shore of the lake, so I climbed up a long flowstone slope and waited for Jim, Ted, John, and Jack. The drop was taped at 86.8 meters. The total depth of the shaft is 138.5 meters, and the depth of the cave is 197 meters. There were no leads at the bottom of the shaft. However, there is a nice display of small cave pearls and massive flowstone. We climbed out of the cave, finishing the survey and derigging as we went. Ted, John, and Jack did most of the derigging. We finished after six hours and walked back to Tamapatz. On the way back, we encountered a small owl that was blinded by our lights, allowing us to closely inspect the beautiful creature from 2 meters away.

On November 20, 1995, Leo, John, Paul, Chris Hudson, and I spent 3.5 hours in Cueva de San Nicolás. Our goal was to determine if the cave had any potential for new cave. The entrance to the cave is 7 meters wide and 3 meters high. A surface stream flows into the cave through trunk passage that averages 7 meters wide and is nicely decorated. We passed through some very large rooms and through a low airspace. We descended drops



CUEVA DE ARENA
 MUNICIPIO DE AQUISMON
 SAN LUIS POTOSI, MEXICO
 MCS SL 553

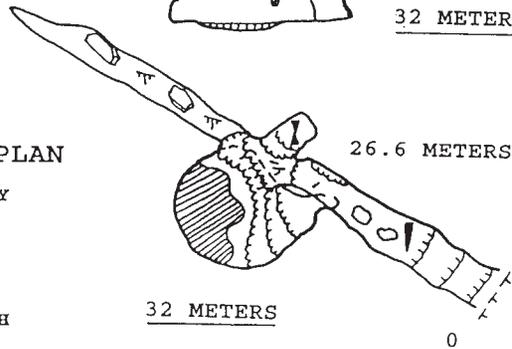
LENGTH OF SURVEYED DISTANCE: 44.99 METERS
 DEPTH: 32 METERS



NORTH



PLAN



GRADE 5 SURVEY

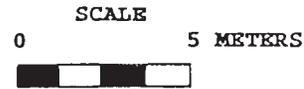
SURVEY BY:

MAURIE BEMANY
 AARON GREEN
 JAMES H. SMITH

SURVEY DATE: 11/23/95

DRAFTED BY: JAMES H. SMITH, NSS 14529F, 1995

SOTANO DE DAR GRACIAS
 MUNICIPIO DE AQUISMON
 SAN LUIS POTOSI, MEXICO
 MCS SL 556

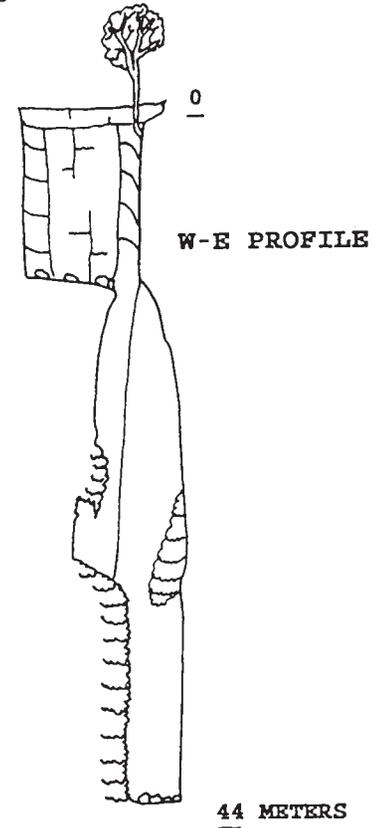


GRADE 5 SURVEY

SURVEY BY:

GERALD MONI
 JAMES H. SMITH
 JACK THOMISON

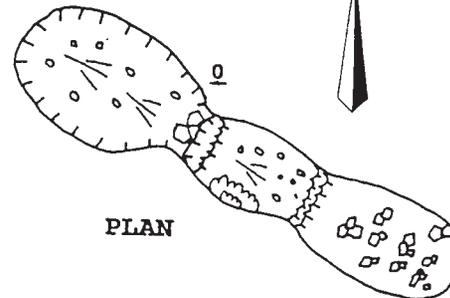
SURVEY DATE: 11/23/95



NORTH



PLAN



LENGTH 15 METERS
 DEPTH 44 METERS

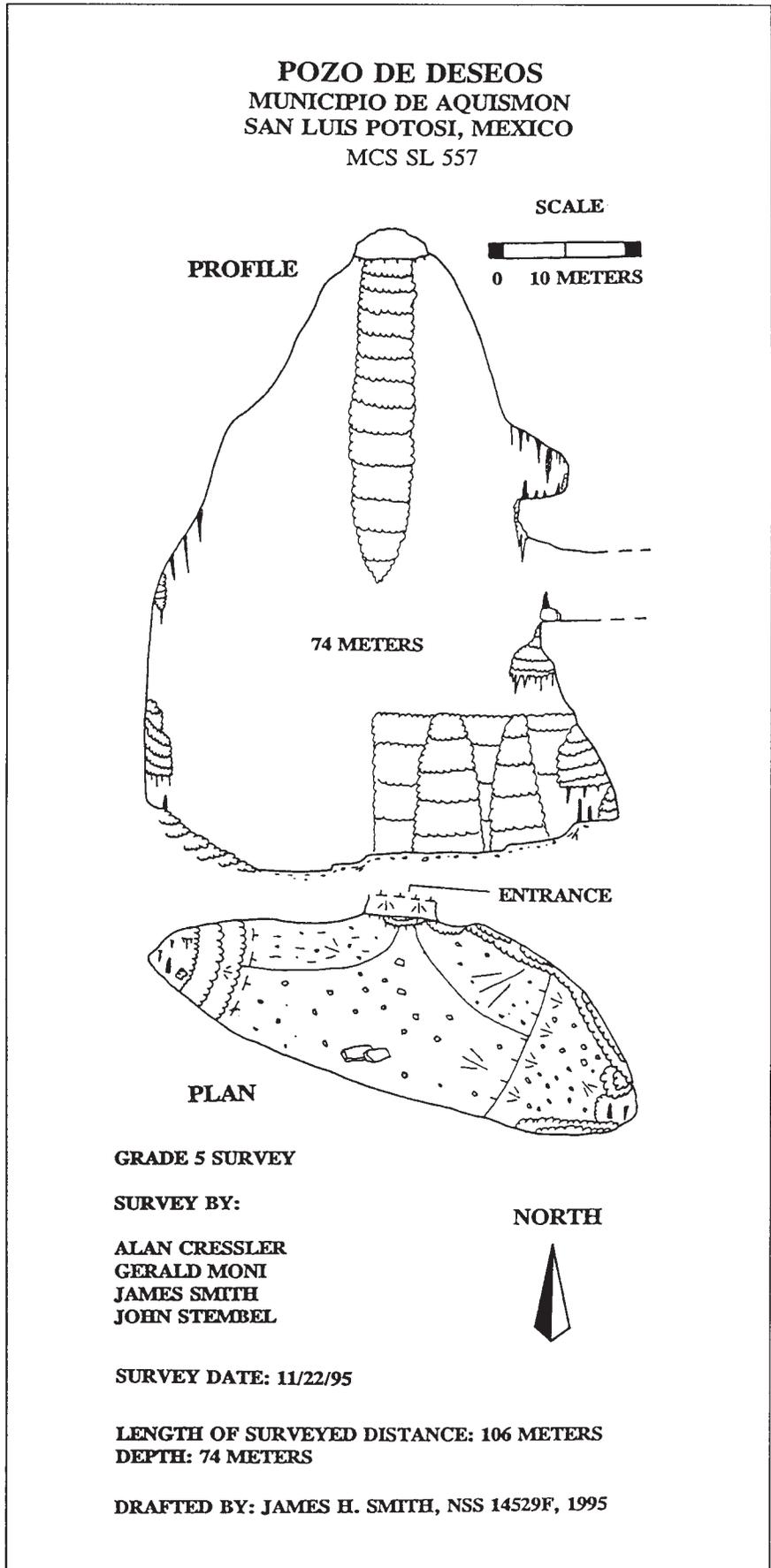
DRAFTED BY JAMES H. SMITH, NSS 14529F, 1995

of 8, 5, 20, 11.5, and 7 meters. The last two drops were very wet and exciting. Climbs of 3, 2, 2, and 4 meters on wet flowstone led to the lowest level of the cave, 172 meters deep. It appeared to end at a pool, but we thought we had made a major discovery when I passed through a low airspace and popped up into a chamber. But the passage ended, with no air flow.

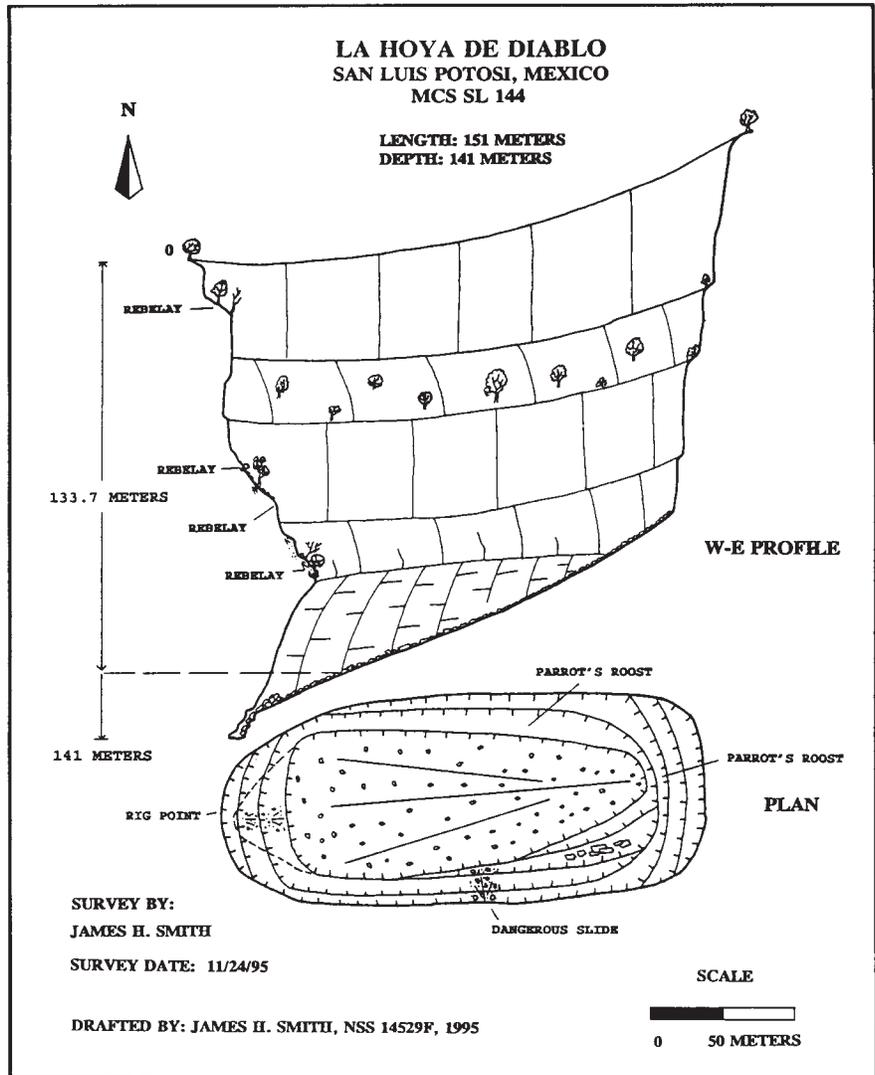
On November 22, our guide Juan Mejia led Chris, Paul, Ted, Alan, Gerald, Chris Hudson, and me along the trail to Aquismón. Somewhere along the way we turned off onto side trails that led to a pit we would later name Pozo de Deseos, or Wishing Well. Paul Aughe got the honor of descending the pit first. The pit turned out to be 74.7 meters deep and was a nicely decorated wall drop.

On the twenty-third, Ted, Maury, John Williams, Gerald, Jack, and I hiked with our guide above Sótano de las Golondrinas into the high karst. We hiked well beyond his familiarity with the area, but he was to prove his worth when communicating with some of the isolated families inhabiting the mountains. His presence also served to eliminate a level of suspicion that could keep us from our goal, virgin cave. The hills had been slashed and burned, and many of the corn fields were thickly overgrown. Our travel was mostly confined to trails. Juan was able to get directions to a cave. We had to chop through vegetation so thick you could not see 3 meters. A walk-in entrance led to a chamber with pots that were used to collect water from drips. Within sight of daylight, we found a 25-meter pit that was nicely decorated. We named the cave Cueva de Arena, Sand Cave. We surveyed the little cave and continued on to the next lead.

We hiked a kilometer further and ever higher into the hills. We had climbed to an elevation of 1800 meters and descended into the forest. We were led to a pit that turned out to be only 44 meters deep. We named it Sótano de Dar Gracias. The last 11 meters of the pit had a nice white-flowstone wall. The hike back to Tamapatz took 1.5 hours.



After concluding our week's work in Tamapatz, we moved north toward Valles and west 67 kilometers toward Puerto Verde. Gerald had been told about an undescended giant open-air pit near the town of Cebadilla. It was estimated to be 150 meters deep. We arrived in the small community and, after getting permission to park, walked 5 kilometers in the direction of our map location. After an hour or so of looking, we finally found this huge pit. Ted descended first, followed by me. On the way down the pit, we rigged five rebelay from ledges and groups of small trees. The pit is at least as wide as it is deep, and for the most part it is a giant funnel cone. Consequently, the rock fall was pretty bad. It won't be a popular pit, but it was worth doing once. The nicest feature of La Hoya de Diablo is the large population of green parrots. The last 30 meters of the 165-meter pit was 20 meters from the wall. A passage was found in the floor of the pit, but it ended after 8 meters.



Paul Aughe at Sótano de Deseos. *Jim Smith.*



Sierra Madre Oriental, S. L. P.

Mucha de la exploración durante el Proyecto Xilitla se describe en detalle. Vea también el artículo de Gerald Moni en este número. Se incluyen mapas de la mayor parte de las cuevas descritas en el artículo.

PIHUAMO RIVER CAVES

John Pint

It was one of those bottomless-pit stories that first brought us to the banks of the Pihuamo River in the southeastern tip of Jalisco. The pit was easy to locate, just a few meters off a wide dirt road heavily traveled by mining vehicles. "Just look for a heap of garbage," said our informant, Don Rafael. "The pit is right behind it." It was about 4 meters wide. "Bottomless, my eye! I can see the bottom from here," said Susy, leaning over the edge of a sheer wall. But when we started to rig it, we could find no spot without all kinds of abrasion points. Since there were plenty of trees around, we ended up using two ropes, one to suspend the other exactly over the center of the pit. Soon we were on the bottom of the bottomless pit, only 36 meters below. Despite a story about bodies being dropped down this hole, all we found were the bones of a small goat. For some strange reason, its legs had been wired together. A bizarre ritual of the nefarious *chupacabras*?

Happily, there was an opening at one end of the pit, and around the corner we found a short passage ending at an enticing drop. This looked like a hole that lots of water had gone down, but it turned out to be too tight only 16 meters down. Because of this pit, we asked Don Rafa, who lives in a nearby rancho with the curious name Fortín (little fortress, but pronounced exactly like fourteen in English), whether there might be any other caves in the area, especially resurgence caves. "Well, there are those caves along the Pihuamo River, just below here. During the rainy season, you wouldn't believe

how much water flows out of 'em." Naturally we were most interested in what sounded like a much bigger find than the pit behind the garbage heap.

The first of these river caves turned out to be a smooth-walled passage maybe 5 meters wide, leading off into the darkness. It was dry at that time of the year, but its cracked-mud floor bespoke plenty of water in the recent past. This cave, said Don Rafa, had no name, so we first christened it the Cave of the Chiropteran Kiss after a very large bat that whooshed out of a side passage with such force that it knocked Luis Rojas, no featherweight, right on his butt. However, deeper into the cave we came upon so many rich-brown, glistening stalactites that it soon got the name Cueva Chocolate, and that's the one that stuck.

Anxious to go even deeper into this cave, Luis Rojas and I returned with tents, figuring we'd camp on the river bank that night. The further we went into the cave, the more obvious it was that a lot of water moves through it. Sometimes the sand banks covering the floor were so high that duckwalking or even crawling was necessary. Smooth-edged fragments of beer bottles strengthened our suspicions of a connection to Pozo Fortín. As we followed the passage along, both of us remarked about what sounded like voices up ahead—maybe the chatting and laughter of women and children. The further we went, the stronger this impression grew, till we came to a big room that, we were convinced, was a public swimming pool (*balneario*). What would these

people think about two mud-covered characters climbing out of some hole in the wall? Water ran under a vast pile of breakdown in the middle of this room. The water was coming from a spring-like hole at one end of the room and leaving via a river passage several meters wide at the other end. The happy bathers were nowhere to be seen; either they were ghosts or just figments of our minds inspired by the tinkling sound of water dripping from the ceiling. Anyhow, the place is still referred to as El Salón de los Duendes, the Goblins' Grotto. On subsequent trips, Chris Lloyd and his British lads attempted to find going passage in the ceiling of this room, but they declined to push the bedding-plane crawl. The entrance and exit of the water are still awaiting exploration.

Luis and I returned to the cave entrance at a rather late hour, bushed. We decided to camp right there inside the cave for two reasons: we were too tired to go hunt up a campsite outside, and Don Rafa had warned us about *mala gente* who prowl around the river at night. In the course of our explorations, we had come upon one wolf spider and a *chinche hocicona*, a big-mouth, bloodsucking bedbug famed for carrying Chagas disease, so we decided to pitch our tents, even though we were "indoors." This would also discourage the cave's many vampire bats from biting our toes.

We conked out, dead to the world until suddenly a loud voice boomed and reverberated in the darkness, "¿Están allí dentro? ¿Dónde están?" It sounded like the bad guys had found us after all, but it turned out

to be Don Rafa, who had arrived at 6:00 A.M. with a thermos of *cafe con canela*, all set for the tour of the cave we had promised him the day before. We now realize that when Don Rafa makes an appointment to do something in the morning, he's not kidding.

A few minutes upstream, there's another cave, locally known as Salitre. This one has an impressive entrance, a sort of rocky balcony just a meter or so above the bank of the river. On this balcony stand several fat columns, and between two of these there's a narrow gap leading into the cave. Stalactites, flowstone, and columns are everywhere to be found, often pure white. While vampire bats inhabit the first rooms you come to, eventually you reach a place where furry little orange-colored bats cover the walls, practically down to floor level. These bats don't seem to mind visitors, appearing rather reluctant to fly away. This presents an ideal opportunity for the photographer, as long as he or she doesn't mind the clouds of "eyeball-biters" that always seem to hang around this particular kind of bat. On one side of this room, across a very narrow mud bridge, there's a natural fountain fed by a small waterfall and, at the bottom of a muddy drop, a lower passage leading who knows where. There's also 100 percent humidity and bats flying everywhere.

It probably qualifies as a perfect environment for catching aerosol-spread rabies.

As we turned to leave, we noticed an intriguing deep crack. We decided to crawl into it for a quick look and soon found ourselves peering down at a lake of clear, green water. Two fish, each over a foot long, were lazily swimming about. Luis Rojas identified them as trout, and we figured this body of water must be directly connected to the river outside.

On a subsequent visit, Chris Lloyd and Juan Blake climbed the waterfall, but once again the dreamed-of upward connection failed to materialize.

The third cave we found along the Pihuamo River was brought to our attention by a man named Catalino, who stepped out of the blackness into the light of our campfire and said, "I hear you are looking for caves." Catalino spoke of a third river cave north of Punte de Fatima that was "bound to contain treasure, so don't forget your metal detector." The next day, on the way to the cave, Catalino showed us three large rocks covered with engravings from a bygone era. The third rock was particularly interesting, because all the figures on it were spirals. "I'm sure it's a map and the spirals mean hills, but we can't quite figure out where the treasure is supposed to be." Ap-

parently the Indians of the past had never been told that an *X* is *de rigueur* for marking the spot.

The entrance to Catalino's cave is 2 meters wide and 1.5 meters high. "This entire opening fills with water during the rainy season," stated our guide, who was already adjusting his treasure-hunter's headlamp. Indeed, we were later shown a flowstone waterfall outside that apparently turns into a raging cascade in the summer. Subsequent informants, however, say the heavy flow only occurs immediately after a storm.

Inside the cave we spotted two *canclos*, cave-dwelling versions of the clawed and black-fanged creepers known as *vinagrillos*. "We call them *tindarapos* hereabouts," said Catalino, and that's where the cave got its name, even though it contains far fewer of these big, spindly-legged creatures than most other caves in semi-tropical areas. We followed a nice walking passage past two easy climb-downs, each above a small pool of water. The second of these is bordered by a series of delicate rimstone dams. The passage ends with a nice display of chocolatey stalactites above a muddy drop 6 meters deep.

After a sabbatical year in Saudi Arabia, we returned to Punte de Fatima only to learn that our guide, Catalino, had been murdered during an argument. We hope that the Passages of Plenty he may now be exploring are filled with the treasures he so earnestly sought. Our ranks had swollen, and our team, now truly international, included Susy Pint, Nani Ibarra, Luis Rojas, and Vicente Loreto from Mexico, Claudio Chilomer from Brazil, Chris Lloyd from Canada, and John Pint from gringolandia. On our first trip beyond Muddy Drop, we used a cable ladder to climb down into a room barely big enough for three people. In its wall was a sort of shelf with a space only about 25 centimeters high above it. To our



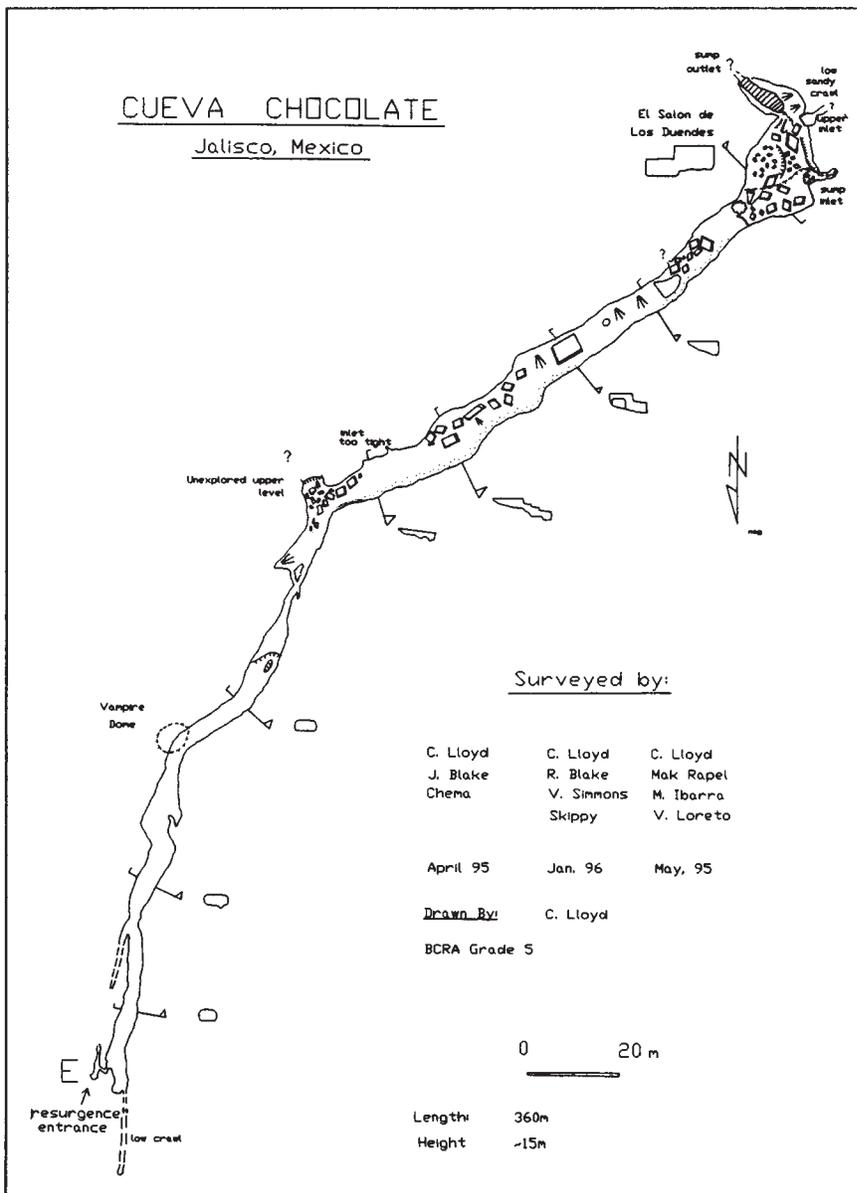
Chris Lloyd (left) and Claudio Chilomer examine the banded rimstone dams in Cueva Tindarapos. *John Pint.*



John Pint emerging from Pozo Fortín, which was rigged to avoid the rough walls. Susy Pint.

surprise, wriggling through this tight slot brought us into a going passage high enough to stand up in. A quick exploration showed us we were in a labyrinth of mud-caked passages, many of them natural fissures. This level of the cave appeared to be a vast reservoir, and we could imagine, somewhere ahead of us, a lovely borehole, kilometers long, connecting the cave to the distant hills.

The survey of Cueva Tindarapos was begun during the spring of 1996, only to be interrupted by the onset of the rainy season, offering us an excellent excuse to forget about river caves for a while, wash out our totally mud-impregnated caving duds, and roam the rich karst hills of southeast Jalisco in search of more bottomless pits.



Cuevas del Río Pihuamo, Jalisco

Se exploraron varias cuevas pequeñas a lo largo del Río Pihuamo al sureste de Jalisco. Vea también el artículo de la Cueva Cuachalalate en este número.

THE COAHUILA HIGHLANDS

Peter Sprouse

The southeast corner of the state of Coahuila covers a portion of the Cross Ranges, where the Sierra Madre Oriental turns west from its typical north-south trend. The Cross Ranges feature spectacular scenery, highly folded rock, and the highest elevations in the Sierra Madre. They also contain a lot of limestone with great vertical relief, the same rock unit that forms Sistema Purificación in Tamaulipas, farther south. Cavers have made sporadic visits over the years, but only recently has the area begun to yield significant caves, as cavers made good use of information provided by local residents. This is certainly the best way to find caves in the highlands, since entrances are not common.

My first trip to the area was in February 1977. The recently released 1:50,000 topo maps showed a line of huge sinks at elevations up to 3200 meters atop the Sierra las Alazanas. Sheila Balsdon, Janet Fitzsimmons, David Honea, Terri Treacy, and I drove up to an old sawmill on the west side of the mountain to begin our hike. We followed an old logging road to reach the westernmost of the large sinks, Hoya la Loba, where we set up camp. No caves could be found in this sink, so we moved on to the next one, Hoya Armenia. One small hole was found there, but it was plugged beyond a short climb-down. David and I hiked on down the ridge to the next two sinks, but didn't find anything. The fifth sink,

The entrance to El Volcán is in the middle of an enormous depression known as Hoya los Gringos. *Peter Sprouse.*

Hoya los Gringos, was considerably farther and lower, so we turned back. The next morning we awoke to snow, sending us to lower elevations, where we did some gypsum caving in Nuevo León.

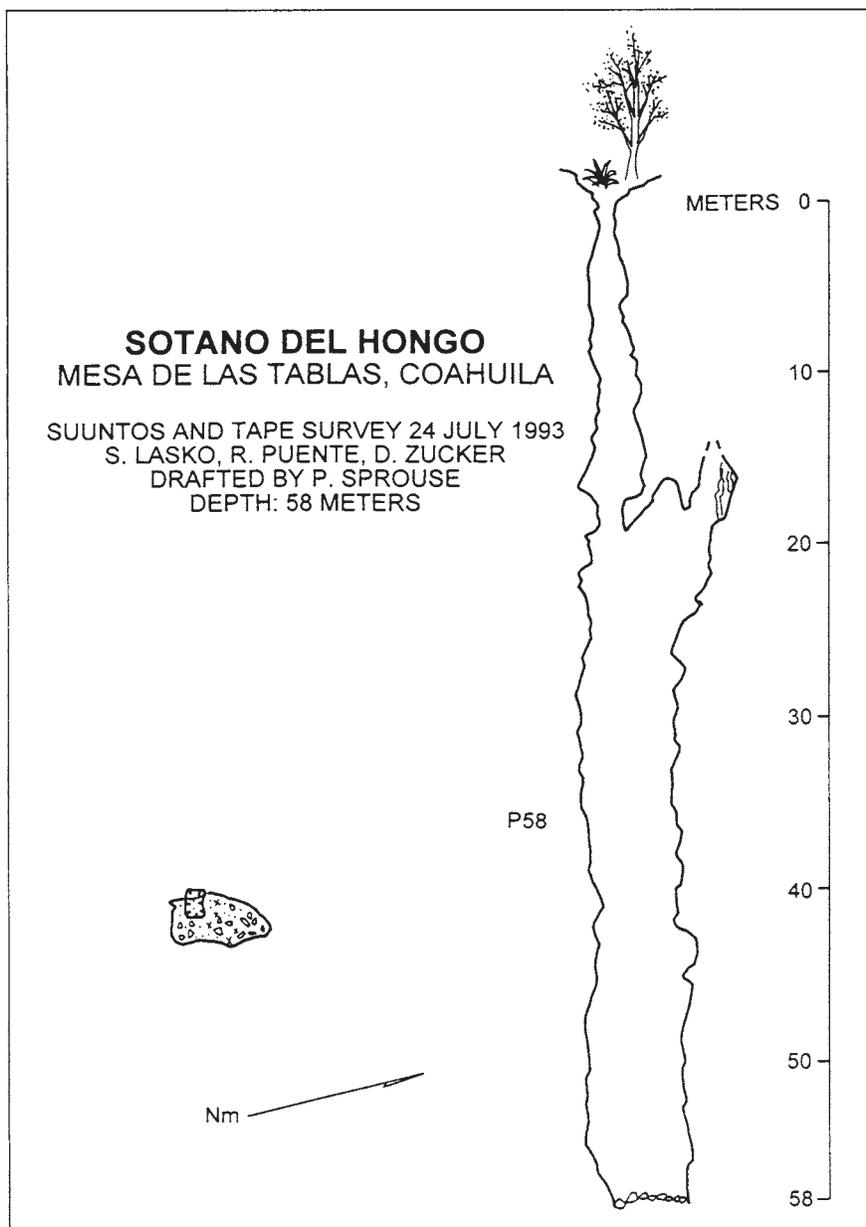
The next ridge to the north, the Sierra Rancho Nuevo, has a sink, though a much smaller one, shown on the topo, so in January 1984 I organized a trip there. When we inquired about trails up the mountain, we heard of actual caves farther east on the ridge south of San José de las Boquillas, Nuevo León. Don Broussard, Jim Feely, Dale Pate, Mary Standifer, Terri Treacy, and I did a steep hike up the Sierra la Viga to check out Cueva del Pino and Cueva la Agua (see *AMCS Activities Newsletter 14*, page 10). While they were not extensive, at least we knew there were caves on top of the ridges. We later found out that two other groups from Texas had visited these same two caves, but had not documented them. The sink

on Sierra Rancho Nuevo is still unchecked.

Another ridge that looks very impressive on the geology maps is the Sierra Coahuilón near Mesa de las Tablas. In July 1990, Cathy Chauvin, Allan Cobb, Susie Lasko, Cathy Winfrey, and I located a road that took us up onto this ridge. We hiked up a steep valley to an area that looked good on the map and located a few karst features, but no going caves. Back down in the town of Mesa de las Tablas, we did hear of a cave west of the town at a place called Los Llanitos. Due to rain, the shaley road to Los Llanitos was undrivable, so we headed back toward Saltillo and mapped Grutas de Arteaga.

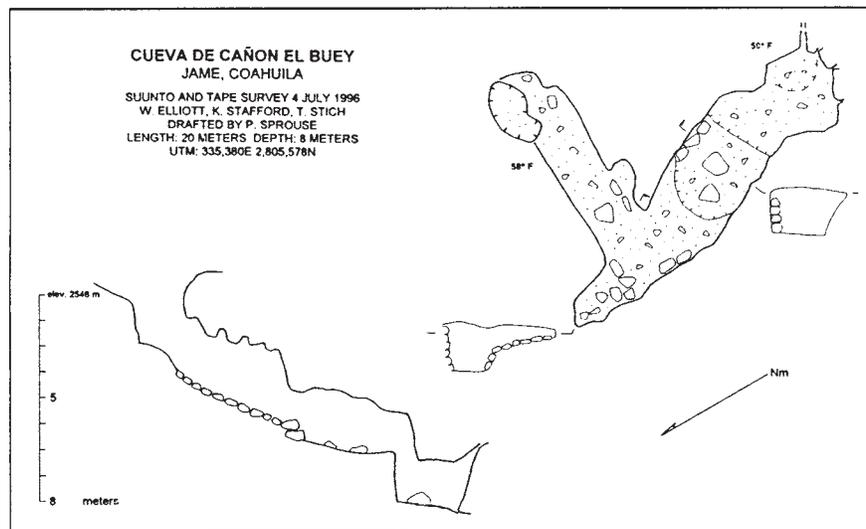
We reached Los Llanitos in July 1993, with a crew consisting of Allan Cobb, John Fogarty, Susie Lasko, Barbara Luke, Raul Puente, Cathy Winfrey, and Daniel Zucker. We were shown the entrance to Cueva de Los Llanitos, which was

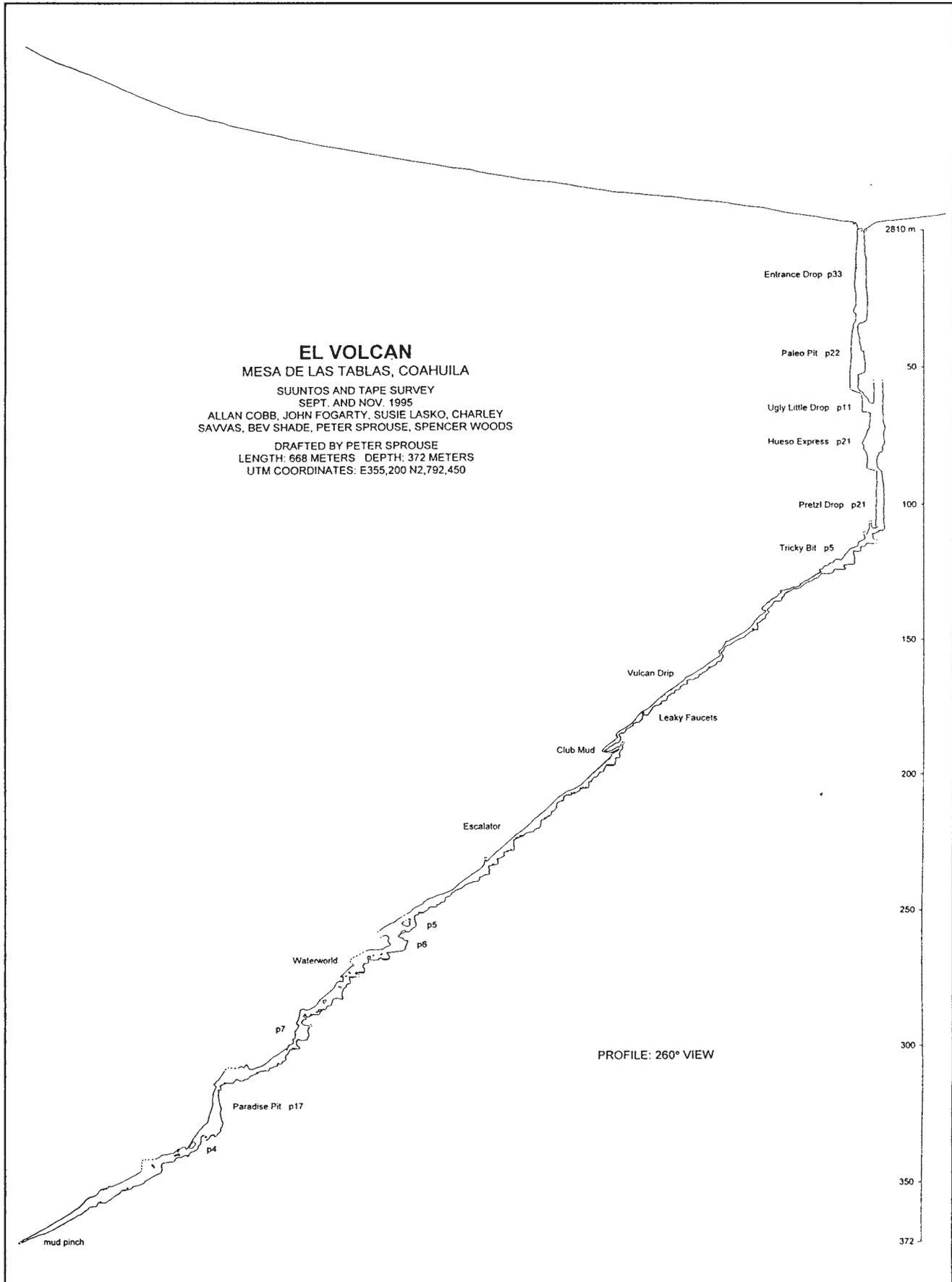




described as being several hundred meters long. A short entrance drop got us into a spacious formation maze. At one point, Daniel was exploring ahead and reported a strange noise. It turned out to be wind through a flowstone constriction. With concerted effort, this could be passed, but it would be a lot of work. For the time being, we concentrated on mapping the cave and checking out the other caves nearby that our guide knew of. Below Llanitos was Cueva de las Chivas, a small cave used by the goats. Raul checked this one out and made a sketch map. Below that were two pits, situated in the side of a deep canyon. Sótano del Hongo was a nice 58-meter shaft, and Sótano del Enjambre went down two drops to a depth of 35 meters. We also were told of a blowing hole known as El Volcán on the Sierra las Alazanas. Things were getting better.

On 2 September 1995, Allan Cobb, John Fogarty, Susie Lasko, Libby McConnell, Charley Savvas, Bev Shade, Cathy Winfrey, and I found someone in Mesa de las Tablas who could take us to El Volcán. We crossed back over the ridge toward San Antonio and made our way through the cabañas of the Monterreal development. We passed by the golf course before descending into Hoya los Gringos, the last of the large depressions on Sierra las Alazanas, which we hadn't checked in 1977. The first sink we walked to looked great, but had some scary-looking fungicide drums blocking the way on. We were taken to a number of entrances and possible entrances, and we were soon getting out the ropes. One pit sounded fairly deep, with a nice, clean echo, and John, Charlie, and Allan set about checking this one out. As it seemed likely to be the one we'd heard about, we applied the El Volcán name to it. It supposedly blows steam at times, as does another that I proceeded to rig. Meanwhile, Susie, Bev, and Libby mapped Pozo Sacacorchos, a short, corkscrewing pit between the two blowing ones. It went down a steep dip and could possibly be

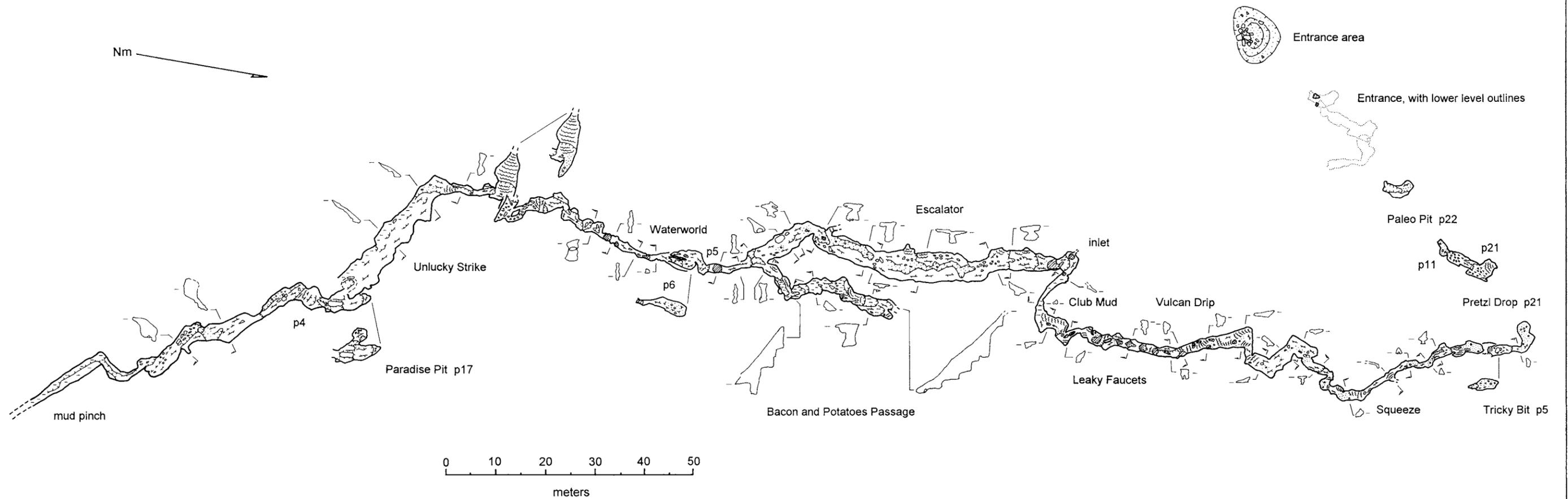




EL VOLCAN
MESA DE LAS TABLAS, COAHUILA

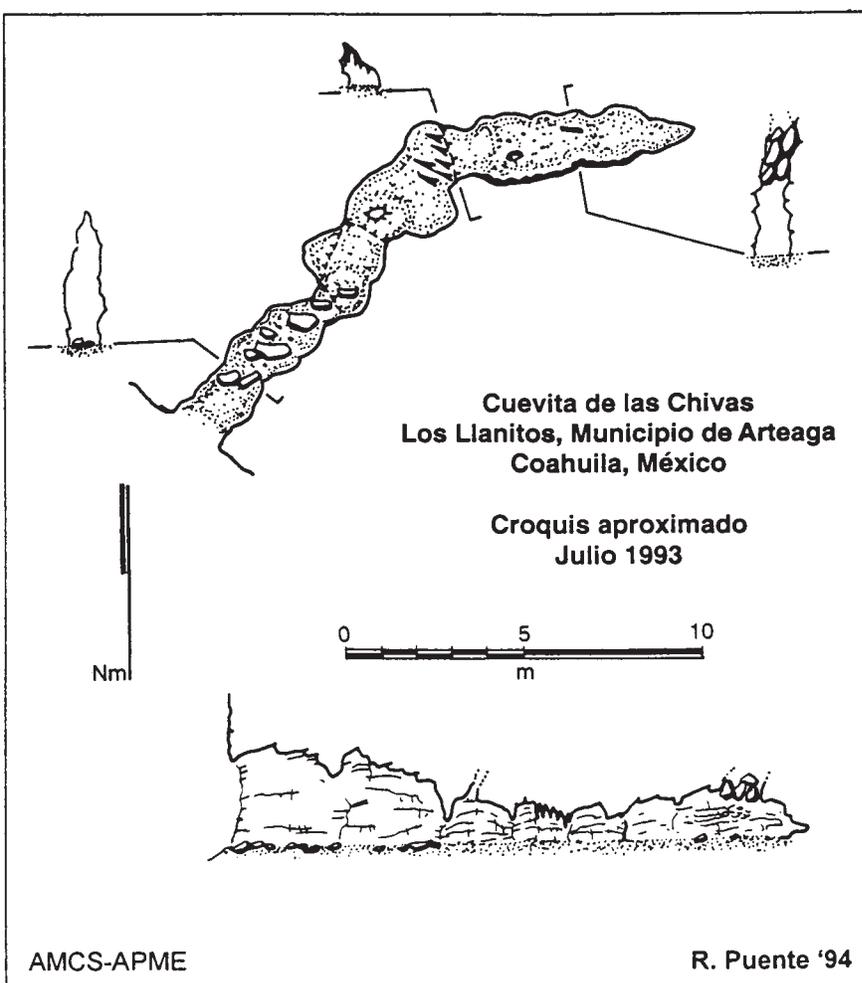
SUUNTOS AND TAPE SURVEY
SEPT. AND NOV. 1995
ALLAN COBB, JOHN FOGARTY, SUSIE LASKO, CHARLEY
SAVVAS, BEV SHADE, PETER SPROUSE, SPENCER WOODS

DRAFTED BY PETER SPROUSE
LENGTH: 668 METERS DEPTH: 372 METERS



dug. In Pozo de la Neblina, I rigged down three drops to a crawlway, then headed out to get Susie and Bev to help map. We surveyed down the drops, past a sackful of syringes someone had tossed in. Bev went on through the crawl at the bottom, to report yet another pitch, but we were out of rope. We climbed out, planning to get the rest of the rope from the other team. But Allan had come back reporting that their cave went also, and that he had left John and Charley 100 meters down, pushing on without rope. Bev decided to go in after them. Late that night they resurfaced, having gotten down about 150 meters. The initial vertical part of the cave went down five pitches to about 100 meters depth. From there, a small passage continued down a steep dip, at times requiring digging. When they turned around, they could see a 20-meter survey shot ahead. Interestingly, bolts found in both El Volcán and Pozo de la Neblina indicate that we weren't the first into these pits. A search through my files at home turned up an Internet posting that seems to describe the same caves. On 16 March 1991, Francisco Hernández Mijares of the group Espeleo-ITESM at Monterrey Tec placed a message on the *Cavers Digest* concerning several pits near La Siberia, Coahuila. As this name doesn't appear on the topo maps, we didn't realize at first that these pits had been previously explored. We've been unable to reach this individual in cyberspace, but it seems that these caves were never mapped. In any event, the digging in El Volcán had now put us in virgin territory.

Neblina was derigged to free up push ropes for a last-day push in El Volcán. John, Charley, Susie, and Bev headed in, while Allan, Libby, and I drove over to Cueva de Los Llanitos to try and push the blowing constriction. At that task we made little progress, and much remains to be done. Allan salvaged the trip by finding a new species of cave-adapted scorpion. This was a spectacular find, as no cave scorpions had been found anywhere near this area before. When we got back



to camp in Hoya los Gringos, I donned my vertical gear to find the others in El Volcán. I had a blast soloing down the initial five drops, then ditched my vertical gear. The route from there involved quite a bit of crawling and several hairy free climbs, which we rigged on a later trip. Most impressive was the steady 40-degree dip of the passage. Seldom had I seen a dip this steady in twenty-five years of exploring caves. At one point the passage jogged right along the strike, creating a low, mucky spot that they had dug out, Club Mud. Finally, at about 250 meters depth, I reached a rope where I made voice contact with Susie. They seemed to be turning around to head out, but took quite a while to do it. Apparently Charley was exploring ahead, and John had to holler for a while to reel him in. Since Charley had the only set of vertical gear along, everyone had to wait for him. Before

he reached them, however, he had trouble getting back through a tight squeeze. A hammer was passed to him in exchange for the vertical gear. On the way out, we derigged, shot photos, and generally suffered from the altitude. We were tired, but exhilarated, as we now had the deepest cave in Coahuila, and it was going. We had no idea where the possible resurgences might be, but the potential seemed great.

Needless to say, we were anxious to get back, which we did in early November. Along on this trip were Susie, Bev, Charley, Jody Horton, Spencer Woods, Matt Schram, and I. Matt, Charley, and Bev were a little late in arriving at the *hoya* due to an unplanned meeting with Nuevo Laredo police and an inadvertent detour to Monclova. Susie and I headed into the cave first to rig the entrance series and install a few bolts. An accidental

drop-test on one of the hammer-drill batteries showed that they don't stand up too well to 40-meter falls. We rigged down the first five drops, then Spencer and Jody went on a little farther to dump the push ropes.

The next day, Charley, Matt, and Jody went in first as the push-and-rig team. As the rest of us filtered in, the drizzle turned to snow. We could hear the rig team ahead of us halfway down the dip series, so we decided to push an in-feeder to give them more breathing room. This Bacon and Potatoes Passage went right back up the dip for a ways to a pinch that had air and could easily be dug open. Perhaps it leads to another entrance in the llano. But the depths called, so we followed the others. Below the eighth drop, I had trouble fitting through the narrow rift that had plagued Charley on the previous trip, but bypassed it by going high, near the ceiling.

Beyond drop nine the cave took a left turn into a gnarly strike-oriented passage that required some grunty crawling. But beyond this Unlucky Strike lay a nice, spacious 17-meter shaft, Paradise Pit. At a 4-meter shaft, the eleventh, we joined up with the push crew, who were returning with the sad news that the cave had ended in a mud pinch. So they headed out with spare gear, while we wrapped up the survey, which showed El Volcán to be 372 meters deep. We were definitely dragging when we surfaced after 23.5 hours, and it was time to get right in the trucks and begin the drive back to Texas. Ah, weekend international caving. Beats caving in the flatlands, though.

July is always a good time to leave Austin for cooler temperatures, and the Coahuila highlands are the closest place. So on 3 July 1996 Bill Elliott, Sara Hardin, Troy Lanier,

Susie Lasko, Kevin Stafford, Tim Stich, and I crossed the border at Laredo and sailed past the holiday crowd at the customs lot, since we already had our car papers. Our grins disappeared 26 kilometers later, when we pulled up behind at least a hundred vehicles jockeying for lanes at the checkpoint. By the time we got through, 45 minutes later, Troy's 4Runner had been rear-ended and then nearly crushed by a merging bus. Things calmed down when we reached the *autopista*, and we found a spot to camp near Jamé before dawn.

We awoke to find ourselves in a field in a wide valley between the high mountain ranges. I corralled the first farmer who walked by and asked him about a blowing hole in the vicinity I'd heard of. Although he wasn't familiar with my lead, he did know of a number of caves around Jamé, including some that blew air. After a bit of coaxing, he

Bev Shade prepares to enter Pozo de la Neblina. *Susie Lasko.*



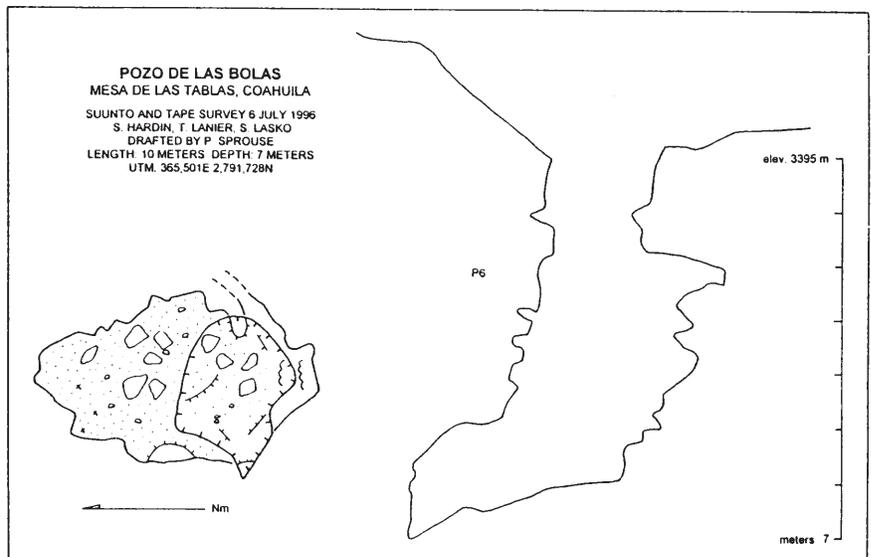
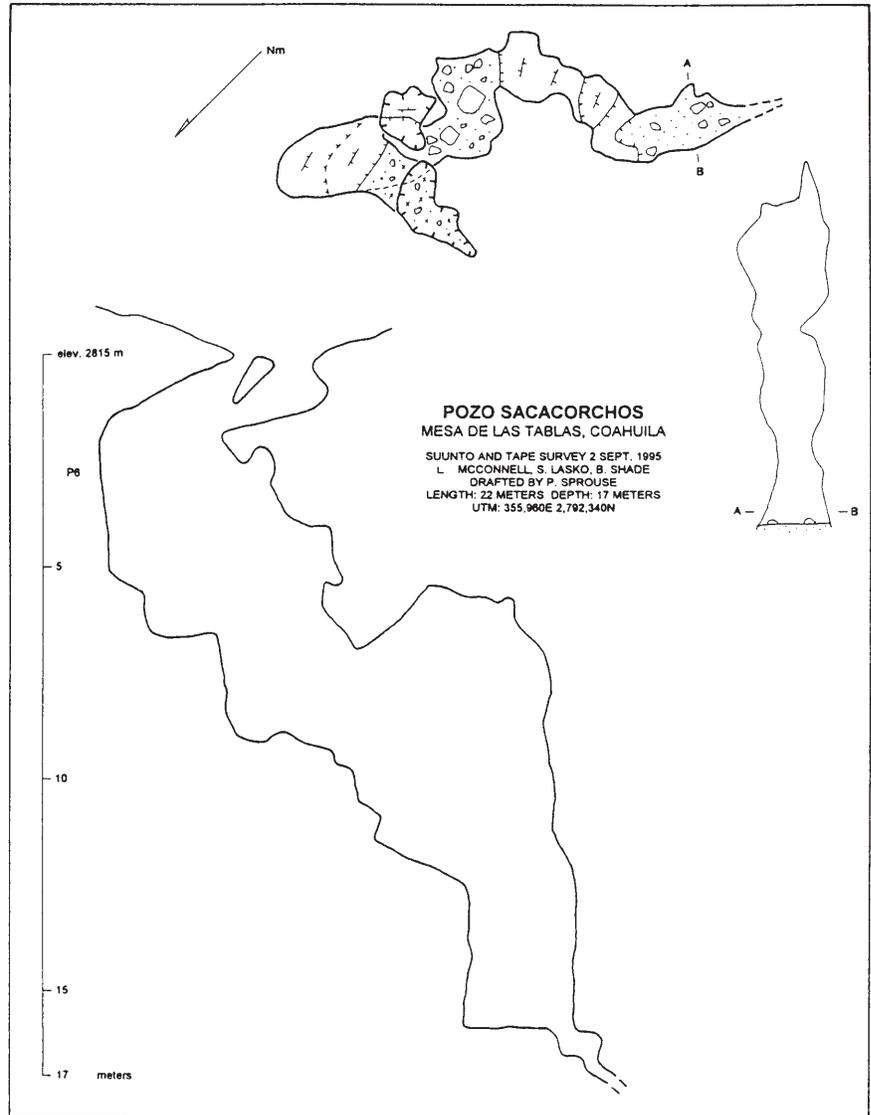
Scorpion found in Cueva de Los Llanitos. *Peter Sprouse.*



agreed to guide us to them. After stopping by his place in town, we drove south through the apple orchards to Cañon el Buey. He took us to an entrance in marginal-looking limestone not far above the valley floor. We judged by the old tailings pile that it had been mined for some sort of deposit long ago. But it was taking a strong breeze, so Bill, Tim, and Kevin mapped their way in. Some boulders blocked the way some 20 meters in, but, considering the airflow, it would be a worthwhile dig.

While they were busy with that, our guide, José, led the rest of us up the ridge that borders Jamé to the south. Without too much difficulty, he located a small blowing hole he'd seen before. It was about 15 centimeters across, but Troy soon had it opened up enough to almost allow entry. Some bedrock would have to be trimmed to continue here, and this would definitely be worth doing, considering the altitude and breeze. But for now, we were just locating leads, so José took us to the cave he identified as Cueva de los Muertos, where bones had supposedly been found. This cave has a nice entrance, but it quickly ends. Then it was time to move on up the mountain to look for Terry Sayther's crew, whom we were scheduled to meet. We couldn't locate them that afternoon, and, with the weather turning rainy, we decided to rent a cabaña at Los Oyameles for the night. It was quite reasonable, and had hot water and an interesting rustic architecture.

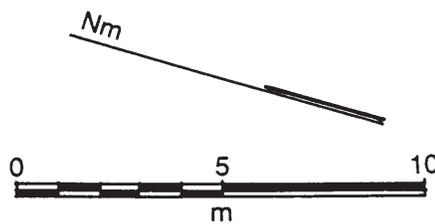
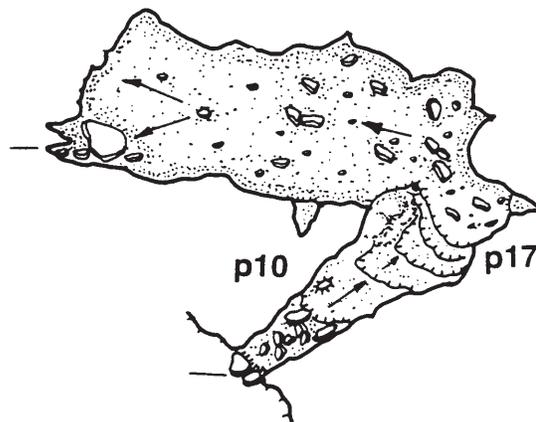
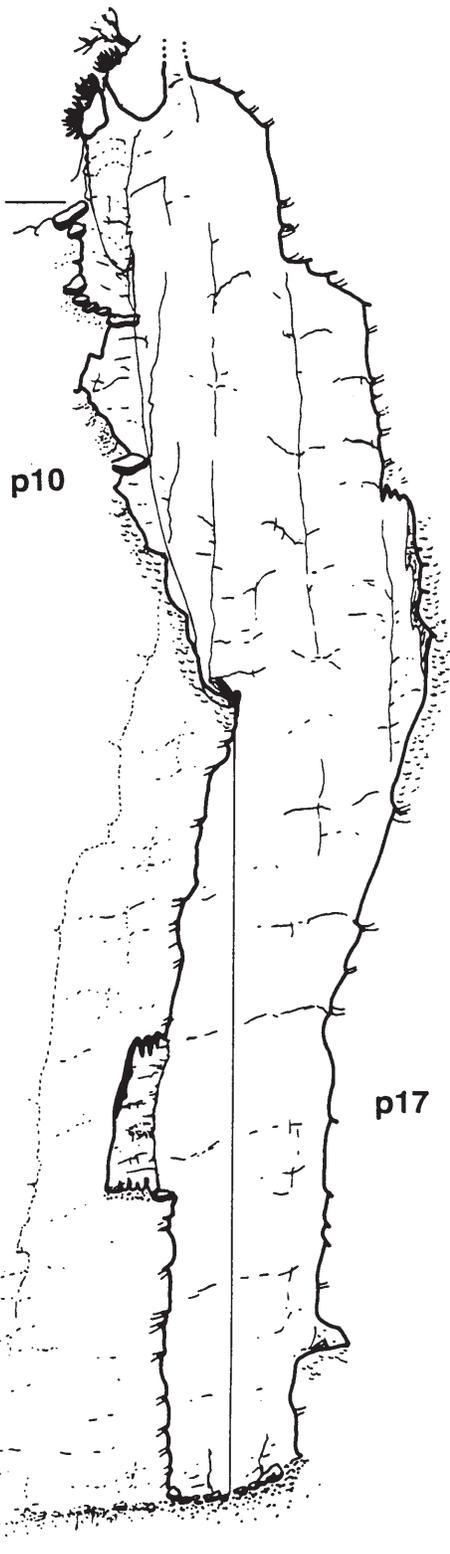
Our main objective at Hoya los Gringos was to push the fourth drop in Pozo de la Neblina, where exploration had been interrupted by the discoveries in El Volcán. As we were gearing up, Sayther drove up, accompanied by Debbie Harris, Duncan Harris, and Larry Hill. As eleven-year-old Duncan was anxious to do more vertical caving, he decided to join our trip. Kevin and I rigged in, while the others followed to pick up the survey. The squeeze below the third drop was too tight for me, so I pulled out the hammer-drill and enlarged it a bit. A couple of climbs down got us to the fourth drop. One bolt, and we



**Sótano del Enjambre
Los Llanitos, Municipio de Arteaga,
Coahuila, México**

Profundidad; -35m Julio de 1993

AMCS - APME

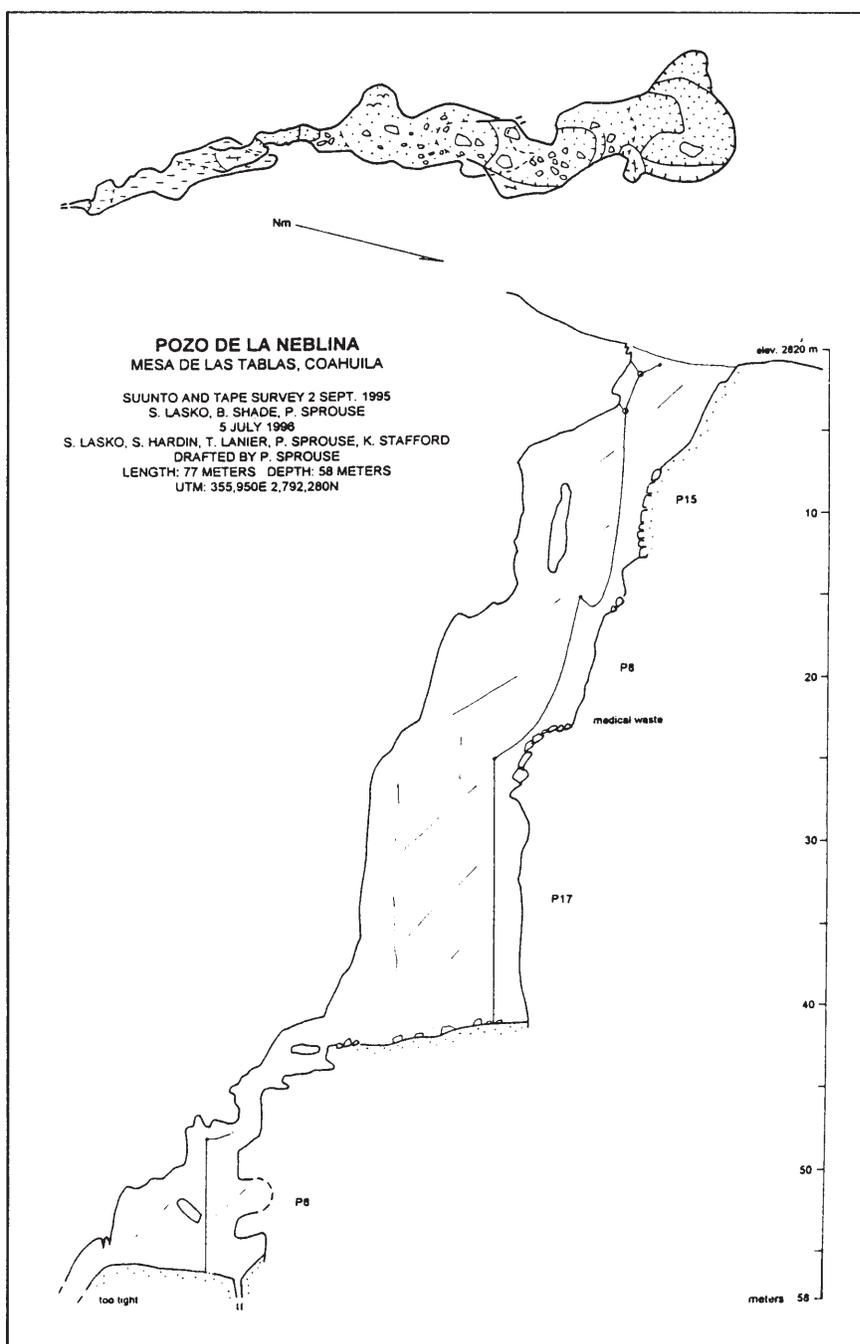


R. Puente '94

were down the 8-meter pitch, only to find a mud fill. So we finished up the survey and derigged. Both Duncan and Sara did well on their first multi-drop cave. More rain had turned the area to mud, so we returned to the cabañas for the night.

We had arranged for the following day a guide who knew of a pit on the Sierra Coahuilón, east of Mesa de las Tablas. The views were spectacular as the trucks ground up onto some of Mexico's highest karst. Our guide led us onto the same ridge we had looked at in 1990, where, to our surprise, there was a pit located only a few meters beyond where we had stopped. Sara, Troy, and Susie explored Pozo de las Bolas. Although only 7 meters deep, it is now the highest mapped cave in Mexico. On the way down, we looked at a few entrances, but they were all blind. With the trip nearing its end, we decided to drive down into the valley to the north to search for more rumored caves. The road down from Los Llanitos toward Jamé was nearly abandoned and a four-wheeler's dream, better to go down than up. We were especially impressed by Terry's story of having made this descent years ago on his BMW road bike. We followed the valley east toward the coastal plain, looking at various entrances that were mostly pockets in breccia. We camped for the night below the huge entrance of La Ventana. This and other entrances high on the cliff walls still await intrepid explorers.

The next morning we continued down the dirt road toward Rayones. Troy got a flat tire, but was considerate enough to do it at a spot with cold beer and *refrescos*. The "paved" road out of the Rayones valley was a suitable finale to a very scenic trip, and as we feasted in Monterrey we contemplated our leads for next time.



Tierras altas de Coahuila

Durante los pasados cuatro años, cueveros han visitado las sierras altas en el sureste de Coahuila. La cueva El Volcán tiene 668 metros de longitud y 372 metros de profundidad. El Pozo de las Bolas es la cueva de mayor altura que se ha topografiado en México.

CERRO BLANCO, PUEBLO NUEVO SOLISTAHUACÁN, CHIAPAS

James H. Smith

On March 8, 1996, Marion Smith, Ted Wilson, and I left for a three-week trip to Mexico to join a speleological expedition in Chiapas. The purpose was to explore and survey caves near the community of Soconusco in Municipio de Pueblo Nuevo Solistahuacán. We joined fifteen other cavers from Mexico, the United States, Canada, and England. The full list of participants was Taco Van Ieperen, Monique Castinguay, and Theo de Raadt from Canada, Angela and Andy Cave from England, Ruben and Michelle Comstock from Mexico, Joe Ivy, Linda Palit, and George Veni from Texas, Peter Haberland and Susan Sanders from New York, Don Coons from Illinois, Pat Kambesis, John Stembel, E. T. Davis, and James Smith from Georgia, Marion Smith and Billy and Monique Strong from Tennessee, Ted Wilson from Indiana, Scott Smith and Lewis Carroll from Virginia, Rebecca Jones from Pennsylvania, Angela Morgan from Alabama, Dave Quillen from New Mexico, and Page Ashwell from North Carolina.

The small mountain community of Soconusco is three hours' drive west of Villahermosa. It is in the middle of Zapatista country and was on the fringe of heavy fighting. Fortunately, a peace treaty had been signed in early 1996 between the rebels and the Mexican government. There was a significant military presence on the major highways that traversed the mountains. We encountered no road blocks, only fortified gun placements. The only hint of rebel-related activity occurred during the

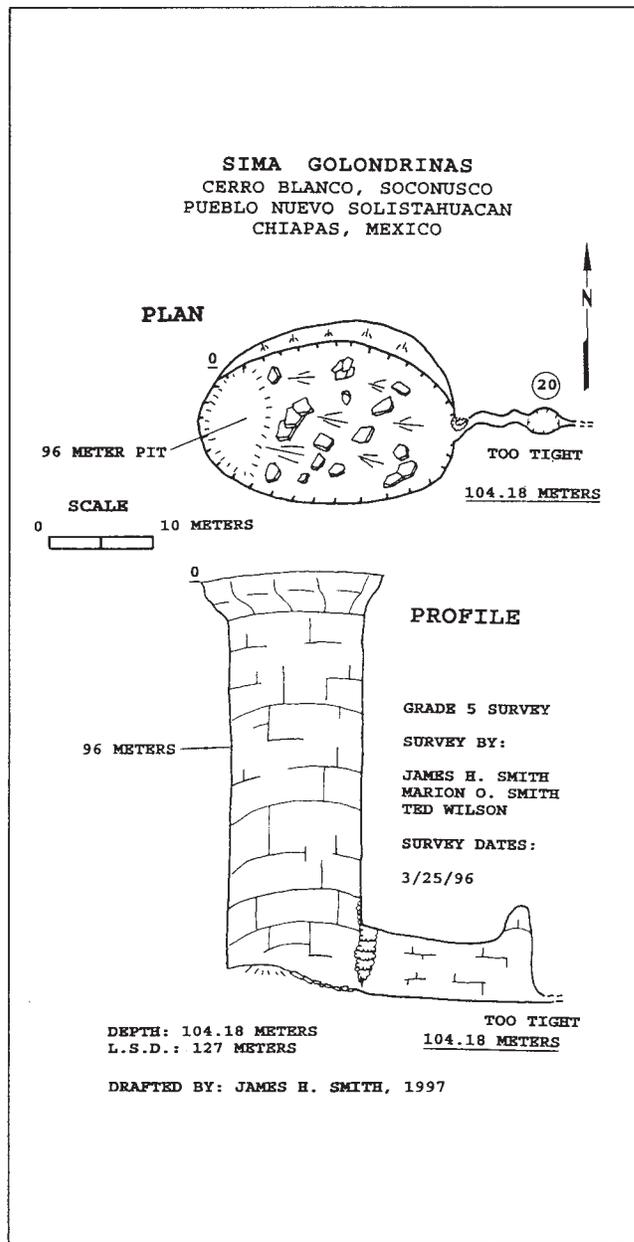
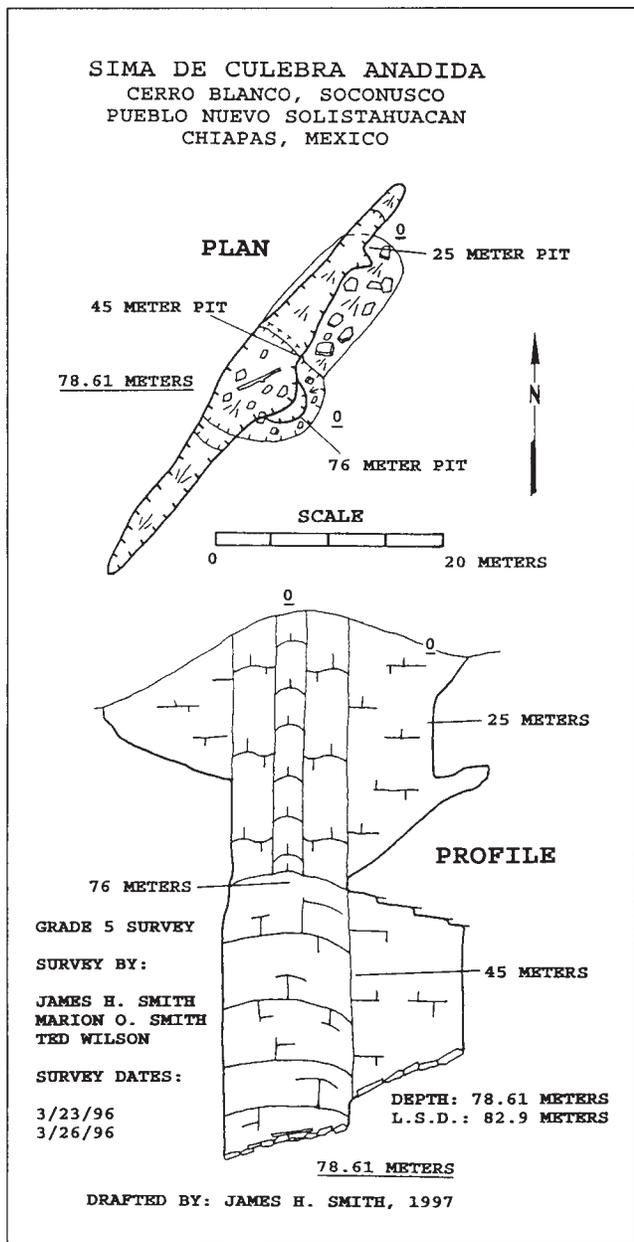
middle of the trip on the road between Soconusco, where our caving base camp was, and Pueblo Nuevo Solistahuacán, which lies on the paved road. Rebels or bandits were active only a few kilometers from our field house. They robbed a local pickup truck after the locals had dropped off a load of coffee. Once, Ruben Comstock, our Mexican-American host, encountered a rock barrier designed to stop a truck. He simply floored his high-clearance truck before he could be held up. Whenever we drove out of the security of the Soconusco area, which was inhabited by friendly Tzotzil Indians, we left a truck guard to discourage vandalism and unarmed theft.

Our first caving adventure was a tour of the commercial Grutas de Coconá in Teapa. The cave was interesting and worth the three pesos admission, but it was the only commercial cave I have been to where I have had to shield my eyes from the lights to see the cave. As to the expedition's activities, I will relate the work in which I participated. The group I was attached to did twenty pits, or *simas*, over 30 meters deep. The area in which we concentrated our efforts was located about 150 meters vertically above the field house, only a ten-minute walk when heavily laden. There were numerous trails crisscrossing the hillside. We had been told there were at least a half-dozen trail-side shafts that had never been explored, and it was possible that there were entrances to the master drainage of Sima Soconusco. Pat and others did overland surveys to each of the caves we explored.

The first new cave was named Sima de Tres Diablos, after Marion Smith, Page Ashwell, and me. On March 11, Page made the first descent of the entrance pit, a 48-meter shaft. The top is 3 meters wide and 30 meters long. We followed a stream passage for 60 meters to a 42-meter pit, which I rigged from a bolt and descended. At the bottom of this pit, the water disappeared into a canyon that was too tight to follow. There was little air flow. Between the two shafts, we followed an upstream passage that bifurcated several times and led to domepits that would require technical climbs. There was significant air in this section of the cave. We surveyed 300 meters of passage in seven hours.

The next day, Marion, Ted, John, and I explored several shafts in a 60-meter-long sinkhole. Marion made the first descent of Sima Ojos Oriental. The pit has several ledges that require two rebelayes, one natural and one bolt. The pit was descended to a depth of 78 meters. The exploration of this cave was never completed, and there is compelling air flow at the top of a 5-meter drop where we ran out of rope.

In the same sink, the next entrance was named Sima Casi Una Quinta. This means almost-virgin pit. We noticed rope grooves at the lip of the pit. Ruben later mentioned that a local had once been thrown down this pit—local politics. Ted descended the 45.8-meter-deep entrance shaft first. The next pit was probably virgin and consisted of an offset 3.3-meter drop followed by a beautiful 77-meter shaft. The



cave was explored and surveyed by Ted, Marion, John, and me.

On March 14, Ted and I returned to Sima Casi Una Quinta and rigged the opposite end of the pit. A thin, fluted partition separated the main shaft. Ted descended a 36-meter drop and reported that a second shaft required bolts. I followed him down with the bolt kit. The second pit required a rebelay 7 meters down, and the main part of it was 41 meters deep. This shaft intersected a passage 18 meters below the bolt, where I could see daylight through a window into the 77-meter shaft. On the other side of

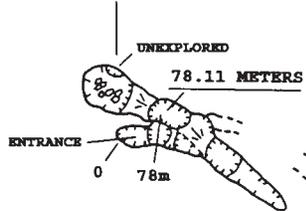
the pit, I felt a cool draft and could see 30 meters up a passage that was ascending toward the uphill end of the sink, where another pit was located.

Also on the fourteenth, we entered the last entrance in the sink, Sima La Grieta. Ruben joined Ted and me to explore the pit. I got the honor of the first descent of the 60-meter entrance pit. A second pit was offset by a few meters, and it measured 31 meters deep. I found a third pit, but was out of rope. After setting a bolt for the third pit, I climbed back to the surface. Ted and Ruben took down an extra rope

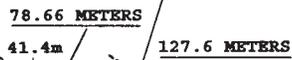
and dropped the virgin 10-meter pit. No continuation of the cave was found. There were no windows trending toward the window in Sima Casi Una Quinta. While climbing out of the entrance shaft, we noticed a partition in this pit, too. We hoped it would lead to Sima Casi Una Quinta or, even better, to another deep shaft. After chopping away the jungle at the edge, Ted descended on the other side of the partition. It turned out to be a 46-meter blind pit. All of these entrances are located within 50 meters of each other in a line of sinks, but none were physically connected.

SIMA DE OJOS ORIENTAL, SIMA CASI UNA QUINTA
AND SIMA DE LA GRIETA
CERRO BLANCO, SOCONUSCO
PUEBLO NUEVO SOLISTAHUACAN
CHIAPAS, MEXICO

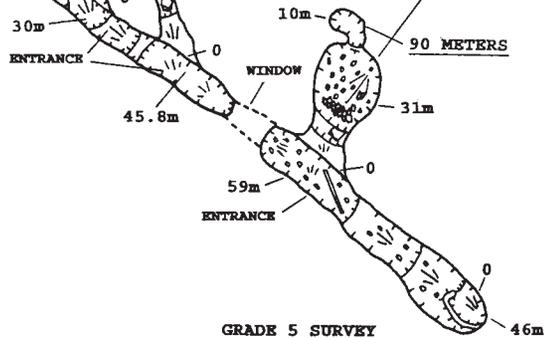
SIMA DE OJOS ORIENTAL



SIMA CASI UNA QUINTA



SIMA DE LA GRIETA



PLAN

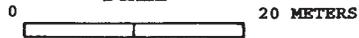
GRADE 5 SURVEY
SURVEY BY:

RUBEN COMSTOCK
MARION O. SMITH
JAMES H. SMITH
JOHN STEMBEL
TED WILSON

SURVEY DATES:

3/12/96
3/14/96
3/23/96

SCALE

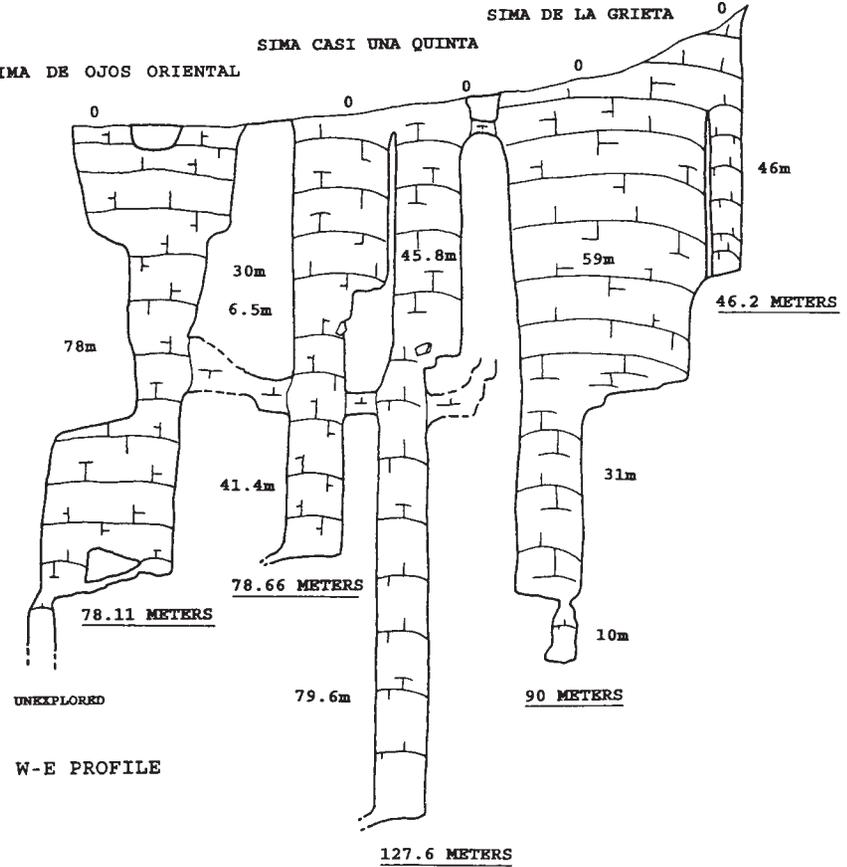


DRAFTED BY: JAMES H. SMITH, 1997

TOTAL LENGTH OF SURVEYED DISTANCE: 469.07 METERS

SIMA DE LA GRIETA

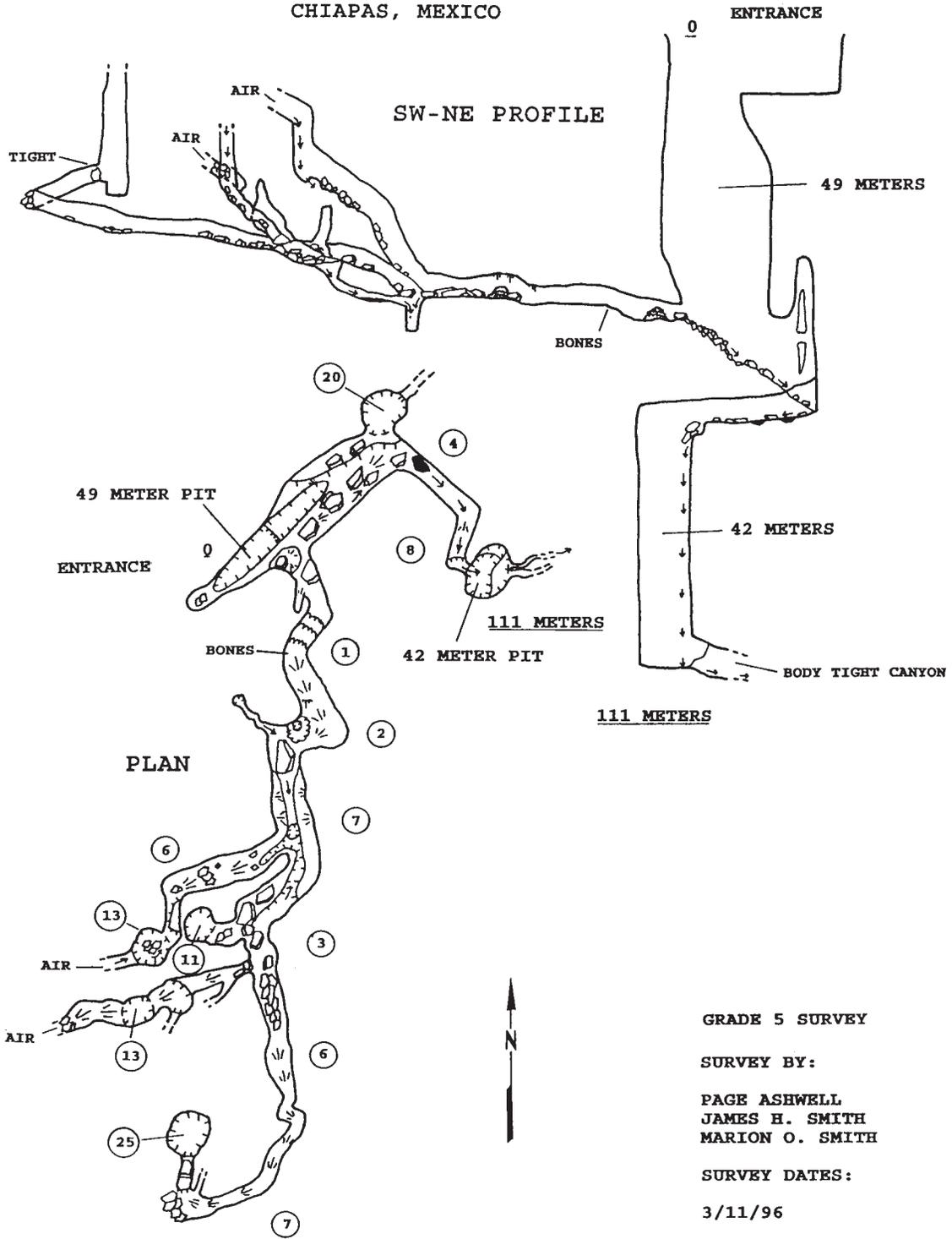
SIMA CASI UNA QUINTA
SIMA DE OJOS ORIENTAL



UNEXPLORED

W-E PROFILE

SIMA DE TRES DIABLOS
CERRO BLANCO, SOCONUSCO
PUEBLO NUEVO SOLISTAHUACAN
CHIAPAS, MEXICO



GRADE 5 SURVEY

SURVEY BY:

PAGE ASHWELL
JAMES H. SMITH
MARION O. SMITH

SURVEY DATES:

3/11/96

LENGTH OF SURVEYED DISTANCE: 436.9 METERS
DEPTH: 111.19 METERS

DRAFTED BY: JAMES H. SMITH, 1997

Sima de Culebra Anadida had been descended the previous year, but Ted did not recognize the pit because we approached from a different direction through the dense forest and used a different rig point. The pit is a 50-meter-long fissure that is narrow at the ends and 10 meters wide in the middle. We descended the pit at the downhill end. We divided the pit with a rebelay into 26- and 46-meter drops. Marion and Doug also approached this pit from another direction, and only after doing a 76.4-meter drop down a wall realized they were in the same cave.

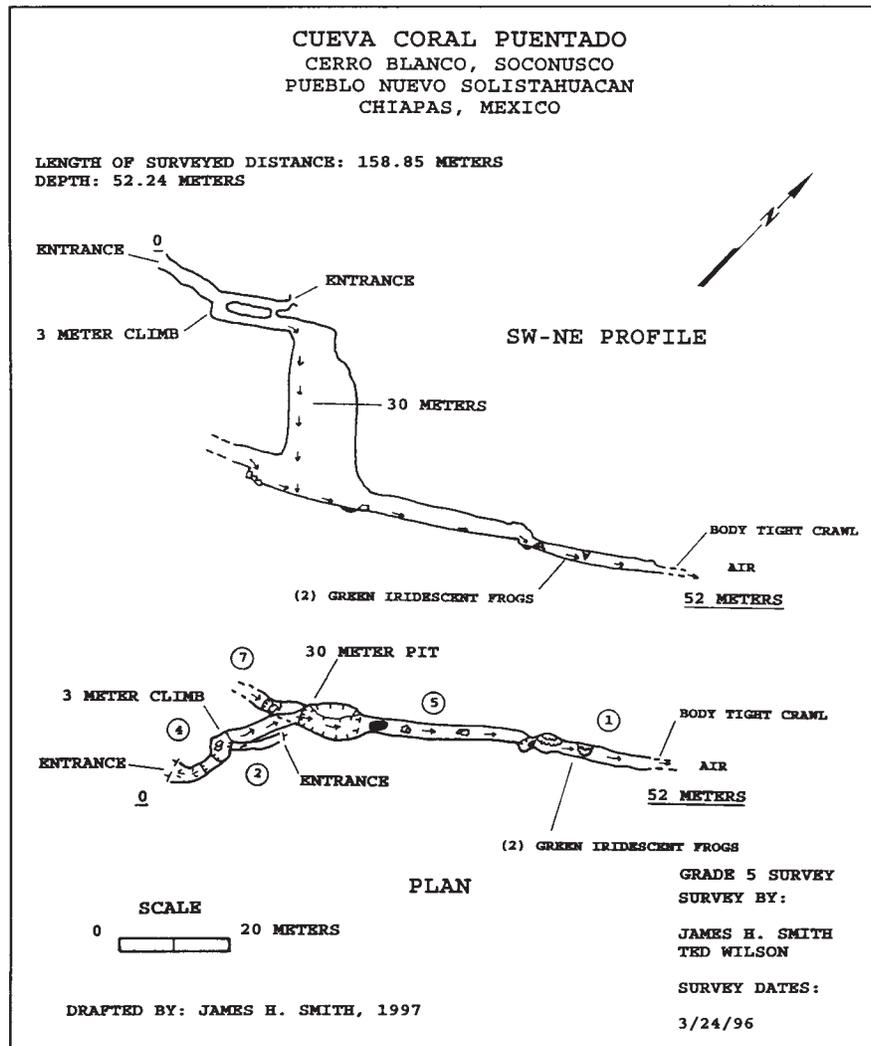
One of the best trips we did was a through-trip from the Blowhole to Sima Soconusco, a distance of 3.5 kilometers with a vertical extent of 330 meters. The previous year, Ted Wilson and Doug Strait had discovered the connection, descending pits of 27, 50, and 27 meters and seven shorter drops to -330 meters, then ascending pits of 3, 3, 12, 9, 12, and 130 meters to leave via Sima Soconusco. The passage from the Blowhole entrance to Sima Soconusco is a long, narrow stream canyon that takes four hours to traverse. The canyon is monotonously narrow, averaging 0.5 meters wide for nearly three kilometers. Three teams were in the cave to survey the connection. Ted and I surveyed 95 stations, for 541 meters. The second team, John Stembel, Don Coons, and Pat Kambesis, surveyed 351 stations for 1.1 kilometers. Their average shot was about 3 meters. The third team, Lewis Carroll, Page Ashwell, and Susan Sanders, surveyed 169 stations. Lewis, their sketcher, did not even sketch the passage. (On a later trip, Don, Pat, and Page closed the remaining gap with a further 110 stations.) Another survey team, consisting of Taco, Scott, and Ruben, surveyed 72 stations in a side-passage of Sima Soconusco. After they finished, they left via the Blowhole. Ted and I left by the Sima Soconusco entrance, up 225 meters of rope and numerous climbs. The 130-meter entrance pit is located only 50 meters from the field house. How convenient! In the

connection passage, at a depth of 300 meters, we found an iridescent green tree frog the size of a human hand.

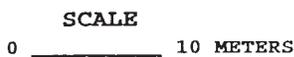
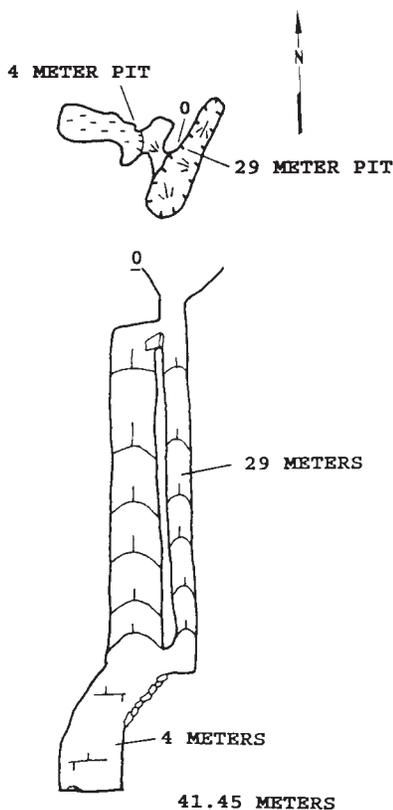
Ted and I explored and surveyed another cave, called Cueva Coral Puentado, the local name for a rare coral snake, *Micrurus elegans*, that Ted caught 60 meters from one of the cave's two entrances. We entered the cave by a crawlway and climbed down 4 meters into a stream canyon. We set two bolts at the top of a 31-meter pit and dropped into a long, narrow fissure. The passage decreased in size until it became too tight to follow. We found more of the iridescent frogs in this cave.

On the uphill side of the road to Soconusco, near Sima Padrada, we rediscovered and surveyed the beautiful circular shaft of Sima

Golondrinas, 102 meters deep. Marion and I descended two other virgin pits, Sima de Pájaros Carpinteros, 37 meters, and Sima Mosca, with 31- and 4-meter drops. We toured Sima Darwin, 175 meters, and improved the rigging at Sima Padrada, 217 meters, with a backup bolt. As one of the best things during the trip, we yo-yoed Sótano Arroyo Grande, at 283 meters one of the deepest pits in the world. All shafts we explored were surveyed and tied in to overland surveys. The overland and cave surveys were entered into a computer by Theo. The line plots were displayed on the monitor, and the data helped to plan exploration strategies and provide a clear picture of the relationships between the mapped caves, the karst hydrology, and the structural geology of the area. Over

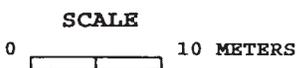
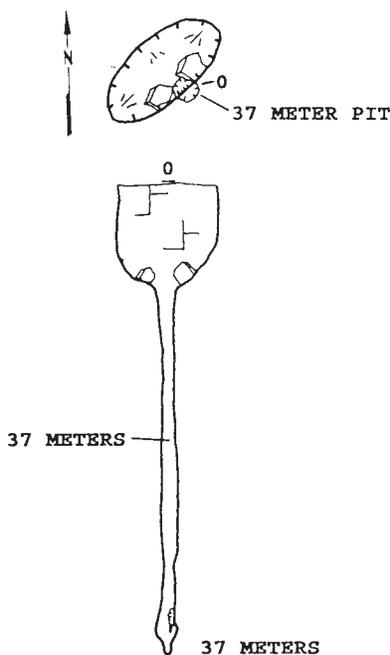


SIMA MOSCA
 CERRO BLANCO, SOCONUSCO
 PUEBLO NUEVO SOLISTAHUACAN
 CHIAPAS, MEXICO



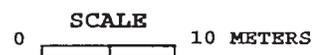
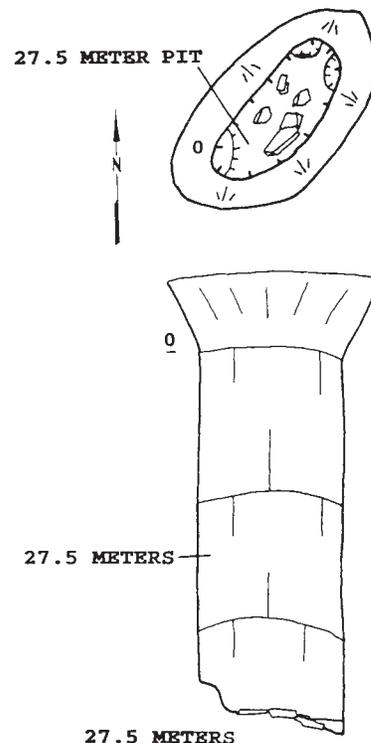
DEPTH: 37.2 METERS
 L.S.D.: 39 METERS
 GRADE 5 SURVEY BY
 JAMES H. SMITH AND
 MARION O. SMITH
 3/25/96
 DRAFTED BY JAMES SMITH
 1997

**SIMA DE
 PÁJAROS CARPINTEROS**
 CERRO BLANCO, SOCONUSCO
 PUEBLO NUEVO SOLISTAHUACAN
 CHIAPAS, MEXICO



DEPTH: 41.45 METERS
 L.S.D.: 44.02 METERS
 GRADE 5 SURVEY BY
 JAMES H. SMITH AND
 MARION O. SMITH
 3/25/96
 DRAFTED BY JAMES SMITH.
 1997

**SIMA LA PICADURA
 EN EL PECHO**
 CERRO BLANCO, SOCONUSCO
 PUEBLO NUEVO SOLISTAHUACAN
 CHIAPAS, MEXICO



DEPTH: 27.5 METERS
 L.S.D.: 38.5 METERS
 GRADE 5 SURVEY BY
 JAMES H. SMITH, MARION O.
 SMITH, AND TED WILSON
 3/26/96
 DRAFTED BY JAMES SMITH
 1997

twenty kilometers of cave passages have been mapped in the Soconusco area since 1988.

Ted and I did a 15-kilometer hike to investigate a new area in the Selva Negra. We were looking for two sinks shown on the topo at an elevation of 1800 meters. The Soconusco field house is at 1360 meters. We left the field house early one morning on a *pasajero*, a local truck, and drove up to 2200 meters, over the mountain toward Pueblo Nuevo. Before reaching the town, we were dropped off at the trail head for Nuevo Ocotol. We hiked up 300 meters in elevation and

dropped over the other side to the village. We asked locals about trail systems that led toward our area of interest, located two kilometers to the west. The locals said there were trails, but waved their hands to indicate that where we wanted to go was a long ways off. Mexican travel time is typically half that of gringos, and when they wave their hands like that it means you might not get there in a day or, at best, it will be a long day. We had wanted to get to our area by following the 1700-meter contour, but the forest might have been too thick, and the last thing we wanted was to have

to chop a trail. We chose to follow the trail system through corn fields and along wood-cutters' paths to get as close as we could before starting to chop. As it turned out, we had to take compass bearings on topographic features to find the right arroyo to walk up. After two hours of following trails that ended or were so faint we were sure we were lost, and then hiking up and down through the karst, we met an Indian who told us of a *rio* up the hill. Eureka! We climbed 200 meters through overgrown cornfields and entered the beautiful black jungle, the Selva Negra. Once in the cloud

forest, the trail was well defined, and we found a huge cave entrance almost immediately.

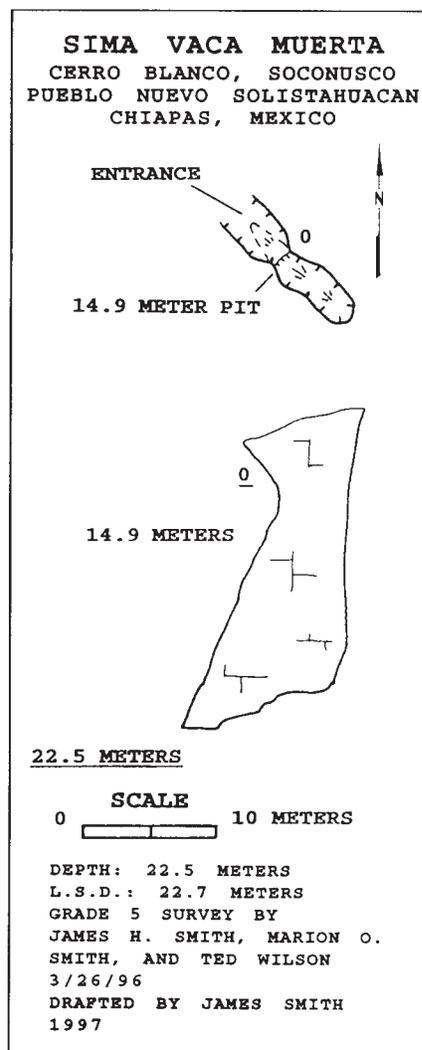
Compelled by virgin cave, Ted and I broke out our lights, which we had really brought for night hiking, and followed a huge passage into the mountain. The passage was 25 meters wide and 20 meters high, and its direction was controlled alternately by the dip and strike of the limestone beds. We traversed at least a kilometer of old passage, until we stopped exploring because we had no backup lights and no one knew where we were. The passage had bifurcated into small phreatic tubes and crawls with no airflow. Our altimeters indicated

that we had reached a depth of 90 meters. We named the cave Black Jungle Cave.

After leaving Black Jungle Cave, we found the kilometer-diameter sink we were looking for and a sinking stream that probably used to flow through Black Jungle Cave. The stream is perched on a sandstone layer. We also found a second cave, which we named Skull Cave. It was 50 meters long, and we left a 7-meter pit undescended. Since we now knew the trails, it took us only two hours to hike back to the trailhead 7 kilometers away. There, we sat in the heat of the day and hoped a truck would drive by and pick us up.

Pueblo Nuevo Solistahuacán, Chiapas

El autor describe las cuevas que exploró y topografió durante la expedición de 1996 a Pueblo Nuevo Solistahuacan, Chiapas. También describe el recorrido desde la entrada del *Blowhole* a la salida de la Sima Soconusco.



THE 1995 RÍO TUERTO EXPEDITION

Bill Stone

Two important pieces of information concerning Sistema Huautla were gained during the 1994 San Agustín Expedition. First, the diving operations beyond the San Agustín sump extended the cave southward to a point nearly beneath the town of Santa María Asunción. This is where the southern flank of the Huautla plateau beings its sharp descent towards the Santo Domingo canyon, six kilometers to the south. Second, the active resurgence spring for the Sistema Huautla water was found to lead 230 meters to the northwest with ample dimensions, and it continued beyond where the reconnaissance team turned back. Previously, this resurgence had been thought impassable to divers, based on a short reconnaissance dive by Noel Sloan in 1984, at a time of bad visibility.

The area below Santa María Asunción comprises three valleys, separated by two ridges that rise 150 meters above the valley floors, trend in a southerly direction, and join at a point at the head of the Peña Colorada canyon, three kilometers to the south. Prior to 1995, no detailed study of this area had been made. It therefore seemed possible that a "middle karst" entrance, a side door, to Sistema Huautla might be discovered there. The logistics implications were enough to warrant a two-month investigation, since an entrance in this area would be less than 500 meters above the level of the Main Drain between Sistema Huautla and Cueva de la Peña Colorada. Should such an entrance exist, it would be possible to extend exploration rapidly toward both the northern and southern

cave systems.

With this in mind, a reconnaissance expedition to scout this area was planned for April and May 1995. If that failed to yield going cave, we planned to return to the resurgence spring with more equipment and time than had been available in 1994. The small village of Río Tuerto, which lies at the head of the Peña Colorada canyon, was chosen for the site of our base camp in 1995.

The initial reconnaissance team consisted of Noel Sloan from Indiana, Barbara am Ende from North Carolina, and Brian Rennex and me from Maryland. Later, on May 5, we were joined by Paul Heinerth and Jill Robjohn from Florida and Kim Cochran from Nevada for the diving at the resurgence.

We arrived in Huautla on April 14, following a week of preparations in the United States and five days of driving. There and at San Miguel we obtained permissions to work at Río Tuerto. We stayed in an unoccupied house on the hacienda owned by Don Félix Carrera García, one of the most well known and respected individuals in the region. As a point of historical interest, it was Don Félix who showed us the entrance to Cueva de la Peña Colorada in May 1981. The friendship has continued for fourteen years. We spent three weeks at Río Tuerto in blazing weather, with afternoon temperatures that easily exceeded 100 degrees with 100 percent humidity. It was, until we became acclimated, unhealthy to be outside between 2 and 4 P.M., the hottest part of the afternoon. There

were days when we were on west-facing slopes in the afternoon and drank four liters of water each, without having to urinate.

Of the two north-south spine-like ridges that divide up the basin that descends south from San Miguel and Santa María Asunción to the Santo Domingo, the eastern one, easily visible from the now-paved road from San Miguel to San Juan Coatzospan, ends at Río Tuerto. The western ridge begins at the village of Llano de Agua and ends at the head of the Peña Colorada canyon; it is the one presumed to contain the main river tunnel for Sistema Huautla. We found dozens of pits and small swallet holes to the east of Río Tuerto, between the eastern ridge and the road. All of the stream sinks in this area were found to be blocked by narrow fissures or filled with dirt eroded from the fields. The Sumidero Río Tuerto, name-sake of the expedition, went down five pitches to a 4-centimeter-high by 1-meter-wide slot carrying sewer water, water diverted from the Río Tuerto to run through Félix Carrera's house and into the sinkhole, a new development since 1984. The end could not be enlarged easily, even by mining, and now there is the biological hazard that the stream is a latrine.

In another nearby sumidero, approximately 350 meters upstream in the dry arroyo that feeds Río Tuerto, we found Fire Ant Cave. The entrance passage leads about 100 meters to an impassable dirt-filled drain. At one side, Barb scouted through a crawlway, then down a small passage to the left, where she began to feel something painful on her wrist. She turned

around to see a roiling mass of red ants tumbling down the dirt. Apparently, a huge colony had formed just under the surface, and when Barb passed over it, she kicked it open. The ant mass nearly covered the passage from wall to wall. Noel braved the ants and found that the passage didn't continue very far. Meanwhile, I went up slope on the far side of the crawlway and found a room with a dome, but there was no way on. By the time we returned through the crawlway, the ants were spreading out, and no one left the cave without quite a few bites.

Elsewhere, farther up toward the road between San Miguel and San Juan, we descended numerous pits in the 20- to 60-meter range, all with dirt floors and no air flow. The only cave that did blow air was a quarter-meter-diameter hole in a cane field near Santa Catarina that was shown to us by some kids. We excavated it and found a 20-meter shaft. At the bottom was another small hole leading off horizontally through solid bedrock. This was the source of the air that warmed in the entrance room, resulting in the relatively warm wind blowing out the entrance. It did not look like a promising dig. With the exception of two pits out on the western ridge near the Peña Colorada canyon, the deepest of which was 60 meters to a dirt bottom, we found nothing west of the Río Tuerto. The rock changes to metamorphic, and all drainage is on the surface. For those who may travel this area, the Río Tuerto lies between the two ridges and carries water year-round, with a flow of perhaps 300 liters per minute in the dry season. People travel kilometers to obtain potable water there. That which is not diverted through the Carrera *hacienda* and into the Sumidero Río Tuerto eventually sinks into gravel approximately 500 meters downstream and is not seen again. Some 400 meters vertically below this point lies Vine Cave, explored in 1984.

One notable non-caving discovery was a large archaeological site occupying an entire knob directly west of Río Tuerto. It was apparently a fortress or a royal establishment

measuring perhaps 250 meters long by 80 meters wide, with numerous 10-meter-high parapet walls. The entire structure was completely overgrown and had a fairly tall forest of walnut trees growing on top of what was obviously laid stone. There were two lintel-framed windows exposed at one location, indicating the presence of internal chambers. Since there are no other ancient edifices on this scale to be found anywhere atop the Huautla Plateau, this may play a significant role in Mazatec history.

Given the lack of success in any of the stream sinks, we began scouting the walls of the Peña Colorada canyon. There we located, from several different views, many of the cliff caves explored in 1984, plus some new ones. In pursuit of canyon-wall caves, Noel, Brian, and I completed the first descent of the travertine canyon below Río Tuerto to the Peña Colorada canyon. We rigged six vertical pitches with 350 meters of rope. On the final pitch, a spectacular 180-meter drop down the travertine falls discovered from the bottom during the 1984 Peña Colorada expedition, we spotted a previously unknown 20-meter-square entrance on the west wall of the Peña Colorada canyon. A week later, Barbara, Noel, and I chopped our way down from Loma Grande, on the west side of the canyon, to it by way of four pitches, 20 meters, 30 meters, 40 meters, and then a spectacular 55-meter free drop into the entrance. As expected, it contained a Mazatec wall inside, but unfortunately it ended quickly. On the basis of numerous green parrot feathers found there, we named it Cueva de los Loros. There were very interesting Mazatec trails leading down there, with two ancient ladders, tied together with vines, hung out over the cliff with around 300 meters of exposure. Not having the proper religion, we rigged ropes. We were extremely excited, though, by having come across these ladders, and I remember saying to Noel, "This has got to be a *curandero* trail." Why would someone go to such great effort to reach a cave that didn't go somewhere in

a big way? In this particular case, they seemed content to build a wall in a deep shelter cave.

While there is always the possibility that we missed something, I believe now that everything that might lead into the middle of the system from this area is plugged with farm dirt. To stay open, as we've believed since 1984, an entrance would have to carry active flow, a spring that would flush out the dirt. This means that there likely is no "middle karst," only paleo and present springs further down in the canyon.

There is now a new paved highway from Huautla to San Juan Coatzacoapan that is independent and south of the former four-wheel-drive road. From Río Tuerto, below Camarón, to Huautla was around thirty-five minutes, and San Miguel to Huautla only fifteen minutes, roughly a quarter of the previous driving time. This was not without its down side, which we discovered during our long-range hikes that began during the second week. A large ridge between Llano de Agua and San Miguel was in the way of the new road, and they effectively lopped off 60 meters of this ridge to pass the road through. In the process, a 450-meter-high talus slope was created that can be seen from 20 kilometers away. In the middle of this talus cone a substantial spring emerges, a spring that before the road was pure and untouched. It now filters through the debris and emerges as a turbid, chocolate-colored stream that forms the primary feed into the pristine Peña Colorada canyon. As a result, what were once clean, clear, blue travertine runs and pools are now dirt-coated runs and zero-visibility ponds with sediment floating on them. With some luck, summer rains may cleanse the canyon, but the muddy feed may persist for years, given the amount of loose debris in the road cut.

On May 7, we set up camp near the Huautla-resurgence spring. The descent was made from Camarón with the assistance of nine burros. All of the diving was done using open-circuit scuba apparatus,

since a reconnaissance hike had shown the spring to be running dirty, with visibility no greater than a third of a meter. The Río Santo Domingo river was in a similar state, apparently due to large storms to the west of the Tehuacán valley. For comparison, the photo of the Santo Domingo in the September 1995 issue of *National Geographic*, taken in early April 1994, shows a glistening turquoise current. This business of bad visibility had repercussions. We had been planning to do most of our diving with MK4 rebreathers, as we had the previous year in San Agustín. However, to use them you have to be able to read the displays to monitor the oxygen content of the breathing mix. Since it was not likely that we could read those displays in the visibility seen on April 30, we left the two rebreathers in Huautla and brought two double-tank sets of open-circuit diving kit for the initial dives, hoping that the visibility would improve with time. Paul Heinerth, Jill Robjohn, and Noel Sloan did all the exploratory diving, with the rest of us providing support by transporting tanks and setting stage bottles for extended-range missions. A total of a dozen forays were fielded into the spring, with Heinerth making the first four pushes solo to a distance of nearly 500 meters from the entrance. On several dives, they began their upstream swim in zero visibility. It was somewhat unnerving watching two divers submerge in thick chocolate-like water and disappear the instant they left the surface. However, 150 meters upstream in the cave, the water mysteriously became clear, with approximately 20 meters visibility. Fortunately, by the time the visibility at the entrance had dropped to zero, we already had a secure guideline that could be followed to the clearer water. We later determined that a portion of the Río Santo Domingo was sinking into a small swallet near that location and mixing underground with the otherwise clean spring water. After three failed attempts, we succeeded in filling in the swallet hole with river stones and constructing a 2-meter-high

dam above that. It was a civil-engineering marvel, considering it was all done by hand. Within a day the visibility improved dramatically in the spring tunnel.

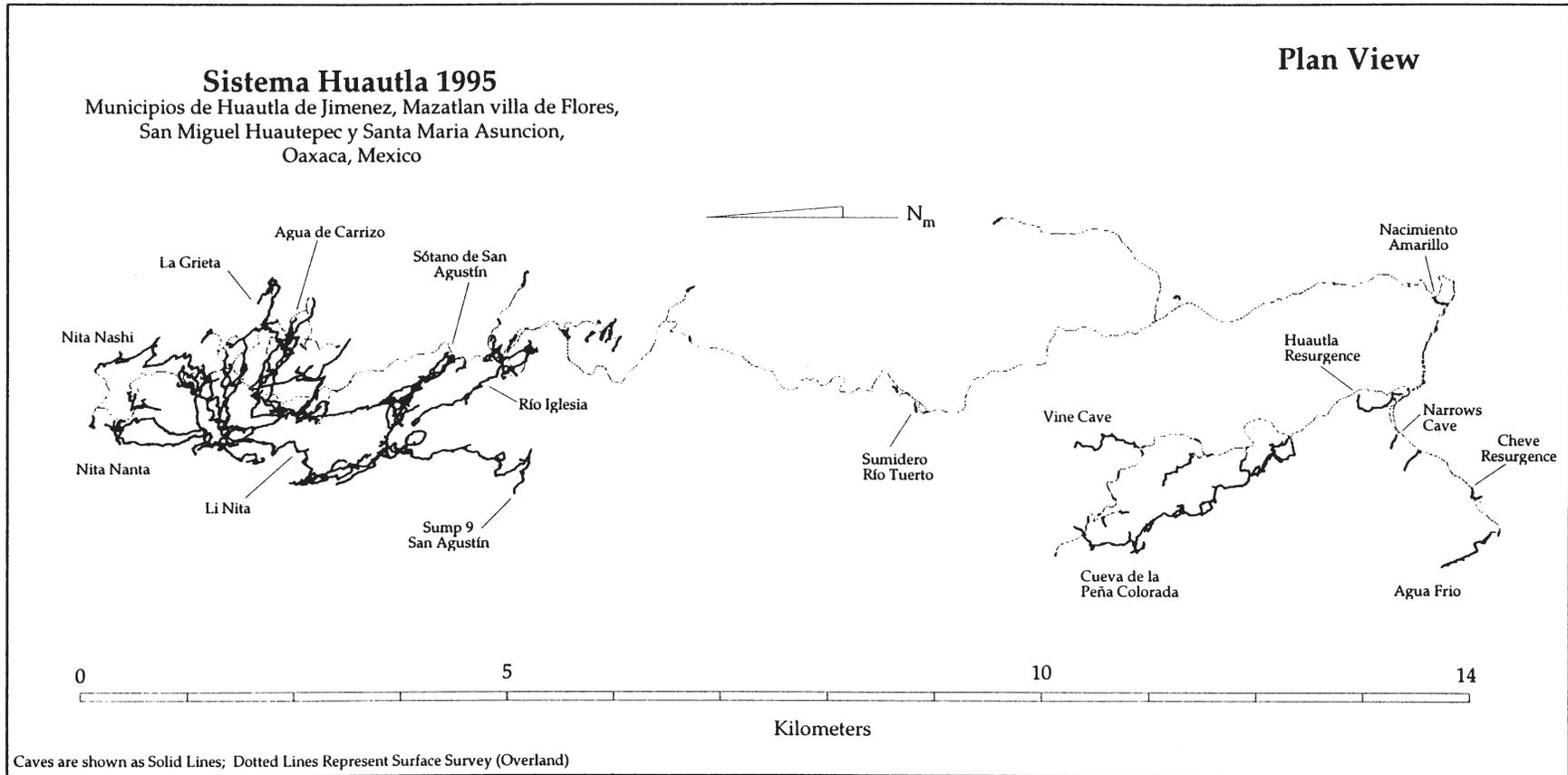
The spring tunnel is by no means resolute in its direction. At first the passage parallels the Santo Domingo at a depth of 15 meters, heading northwest for 150 meters beneath the striking cactus-studded fin of rock that separates the Peña Colorada and Santo Domingo canyons. At that point it surfaces at the base of a 25-meter shaft leading up to daylight on the south face of the ridge. This opening, which we named Fruit Bat Pit because granular guano there was evocative of a different type of bat, was located on the surface by Rennex, and was later used for setting stage bottles. The divers still preferred to enter via the spring, since it avoided a steep ascent up the ridge in full diving gear. Beyond this shaft, the spring tunnel submerges again and descends to 25 meters depth, where it heads north for 300 meters. At this point, a vertical shaft leads up to a 12-meter-diameter air-filled chamber. On the northwest side of the chamber, a 1.3-meter waterfall pours down with the full flow of the subterranean Huautla river, the same flow seen just before Sump 9 in San Agustín. Heinerth reported discovering the waterfall from underwater on his initial entry into the room. With his dive light, he could see the turbulence from 10 meters below the surface of the lake. Ironically, this was the reverse of the sump diver's worst nightmare, surfacing at the top of a large waterfall and being drawn over the lip by the current. In this case, it was a welcome sight, and Heinerth felt initially that he had cracked the spring tunnel and would be able to ditch diving gear and explore dry cave beyond. Unfortunately, things are never that easy in Huautla.

Just beyond the waterfall, Paul discovered an 8-meter-diameter pool from which the stream welled up. On May 16, Paul and Noel, using back-mounted twin 3000-liter tanks and a single 3000-liter stage bottle each, entered this pool and followed the submerged tunnel on

a straight north heading for 350 meters. The route descended on a constant slope to 40 meters water depth in very large passage. They turned their dive 790 meters from the entrance.

The two final pushes, on May 18 and 19, both made by Robjohn and Heinerth, involved double-stage dives, with four tanks per diver and heliox 86/14 (14 percent oxygen) for the most remote sections of what proved to be a very deep upstream tunnel. The maximum penetration was 932 meters from the entrance at 60 meters depth at the roof of the tunnel. Passage dimensions were 30 meters wide by 10 meters high, with the full flow of the Huautla river and roughly 20 meters visibility. Heinerth, during his post-dive debriefing at base camp, reported being surprised at the compass readings he was getting during his survey out from the point of maximum penetration. From the point where he and Noel had stopped, the tunnel abruptly turns east for 150 meters and begins crossing under the floor of the Peña Colorada canyon, as shown on the map. Reduction of the survey data showed that the limit of exploration is approximately 1200 meters south of the entrance to the Cueva de la Peña Colorada, but at a depth nearly 120 meters below it. The data suggest the possibility of surfacing into a large cave inside the east wall of the Peña Colorada canyon, opening an entirely new possibility concerning the extent of the cave system. This might also help to explain the presence of Vine Cave, which seemed quite mysterious in 1984 because its entrance was on the east wall of the canyon, whereas all the other large caves discovered in 1984 were inside the west wall.

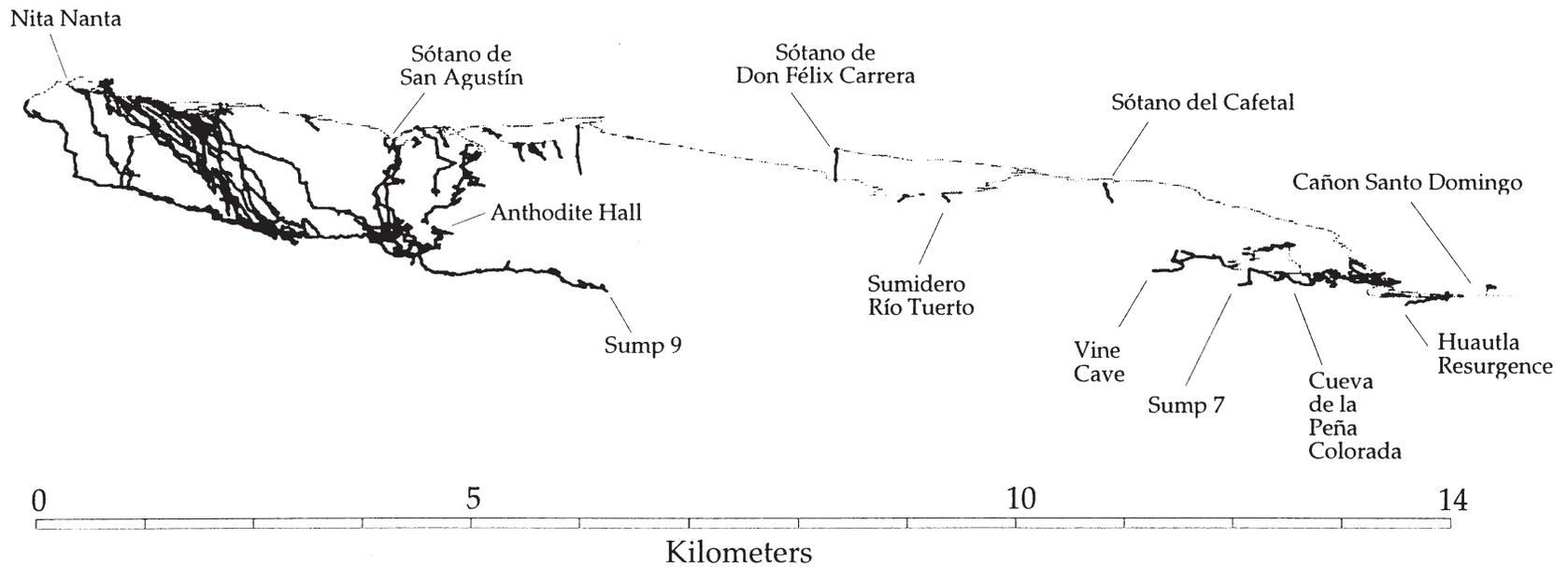
The good news is that the frontier is wide open and beckoning to be explored. The bad news is that the last dive was five and a half hours long because of the required decompression, and the tunnel is headed deeper still. Besides its implications for logistics and technology, this depth has interesting ramifications for the maximum potential depth of



225° Profile

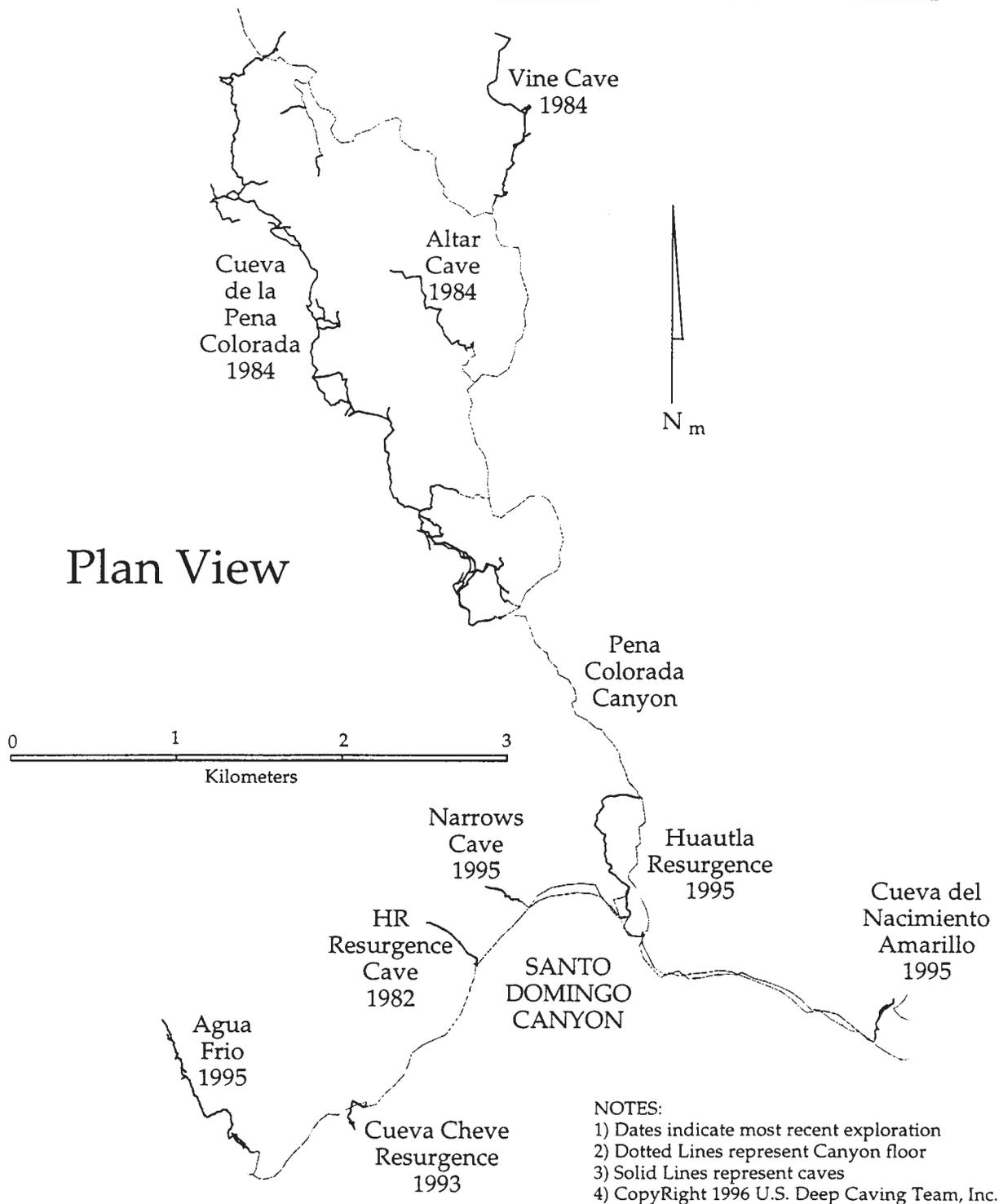
Sistema Huautla 1995

Municipios de Huautla de Jimenez, Mazatlan villa de Flores,
San Miguel Huautepac y Santa Maria Asuncion,
Oaxaca, Mexico



Caves are shown as Solid Lines; Dotted Lines Represent Surface Survey (Overland)

Caves of the Pena Colorada and Santo Domingo Canyons
Municipios de Huautla de Jimenez, San Miguel Huauteppec,
and Mazatlan villa de Flores, Oaxaca, Mexico



Sistema Huautla. A 100-meter-deep spring tunnel would extend the achievable depth to 1740 meters, not counting the 140-meters-plus potential for higher entrances on the Agua de Cerro ridge. Counting everything, Huautla could max out at 1850 to 1900 meters deep. Everyone agreed that a return to the resurgence is in order, but that it is going to require rebreathers and electric underwater propulsion vehicles to minimize what will amount, eventually, to a decompression barrier due to the cold. Even the best exposure suits and insulation will not maintain body heat after eight hours underwater at the 60-degree temperature of the stream, and there is no possibility of putting a habitat there. It is difficult to say how far or how deep the tunnel may go before turning upward, but the fact that the deepest point thus far appears to coincide with the point where the cave is crossing beneath the floor of the Peña Colorada canyon suggests that it may turn up within a reasonable distance of three to five hundred meters and surface in dry passage. We have discussed the possibility of establishing a dive base at the waterfall chamber, using suspended living quarters similar to those used in San Agustín. The room would have to be used for an extended time of decompression before making a final dive out of the cave. The assumption is that the flow and turbulence of the waterfall will be sufficient to maintain a suitable oxygen-carbon dioxide balance in the chamber for a crew of three living there for a long time. If this concept can be made to work, the decompression penalty associated with a long dive in the final deep tunnel can be minimized.

Another significant discovery of the expedition was a fossil resurgence cave, the Cueva del Nacimiento Agua Frío de Mazatlán. A portion of this name may sound familiar to some who know the area. In 1984, the Agua Frío spring was found approximately 800 meters up-river from what is now known as the Cueva Cheve resurgence and its associated fossil cave,

the Cueva de la Mano. Agua Frío was actually dived in 1984, during the Peña Colorada expedition, but the spring tunnel was found to quickly narrow to a tight, impassable fissure. As a result of this disappointment, no further effort was directed to this area.

Eleven years later, a rather serendipitous series of events was to bring us back to Agua Frío. Given the lack of success in the Río Tuerto area, we decided to investigate the Municipio de Mazatlán, to the south of Huautla. When we arrived there, we were given a warm welcome by the town mayor, Melquíades Rosas Blancas, and invited to lodge there in the building that houses the municipal offices. Over the next three days, we were shown numerous earth cracks in the large "Chiquito" canyon to the northwest of Mazatlán. Although there were many of these fissures up to 50 meters deep, all were formed in metamorphic rock. The limestone contact lies some five kilometers to the east, running northeast from Agua Frío toward San Miguel. Following some enjoyable discussions with the *presidente*, it was decided that on Sunday, April 30, the Día de los Niños, we would all descend into the Santo Domingo canyon, where they would show us a cave they knew. They were explicit in their descriptions that one could enter the mountain for at least 300 meters to where there was a great *pozo*.

On the appointed day, we left our vehicles at the *agencia* in Loma Grande and began a three-hour descent of the Armadillo canyon, which is one canyon to the west of the Peña Colorada. In fact, during much of the journey I was certain that we were close to being directly over the passages we had tramped through in the Cueva de la Peña Colorada in 1984. We were soon joined by a political entourage of some fifteen individuals from Mazatlán on foot and horseback, including the *presidente* and several armed guards. When we arrived at river level, I immediately recognized our location and began familiarizing myself once again with the Agua Frío spring. Soon they

showed us the obscure dry entrance to the fossil resurgence, and we were soon firing carbide lamps and leading the entire group inside. It was quite a retinue, including adults, kids, and the *guardia*. We politely requested that they remove the ammo clips lest they accidentally discharge the guns inside the cave. The diminutive walk-in entrance quickly opened up into a 20-meter-wide room. There was evidence all around of *curandero* activity: glass bottles filled with water, incense burners, pot shards, and so on. Local legend holds that for thousands of years a powerful witch lived in the cave, so powerful that she could cause both drought and plenty, cause the Agua Frío spring to run free or dry up and crops to grow or die. Individuals from Mazatlán assert that the early Mazatecs from this area paid homage and made offerings to the witch at the spring in order to assure their survival.

Beyond the Curandero Room, the passage led through a low crawlway into another larger chamber, and there, on the left, was the shaft they had reported. It was a good 30 to 40 meters deep. Rocks dropped gave a resounding splash; clearly this shaft would take us down to the river that fed the spring. We elected Noel to make the first descent. He never got off rope, and therein lay the source of some misdirected effort later in the expedition. Noel reported that the downstream canyon, measuring 8 meters wide by 20 meters tall, continued out of sight with wall-to-wall water, and that the upstream canyon sumped. We explained the situation to our hosts, and, after everyone had left the cave, they all proceeded to ride up the mountain at dusk, but not before every one of them spent a good half-hour in the spring run plucking hapless snails from the red-colored algae that coat the rocks in the run. They left with brimming hat fulls of what apparently is a delicacy in this region.

We remained at the river for a planned two-day reconnaissance. That evening, around midnight, we awoke to notice four lights on the south side of the river heading

toward us. They stopped directly across from our camp and began shining flashlights at our tents in a manner that appeared menacing. We got up, got dressed, and hid behind rocks. After a few minutes, we decided to shine a light back to let them know that the camp was occupied. No sooner had we turned on the light, when a gunshot echoed from the other side of the river, a high-pitched, loud crack. We instantly put out our light and abandoned camp. They also put out their lights. Fearing further pot-shots, we groped to find the trail in the total darkness of a new moon and slowly made our way back towards Loma Grande. We waited a kilometer up the trail, crouched in the jungle in our shorts, until dawn. Noel was the only one who had a halfway comfortable night, because he had managed to stuff a hammock and sleeping bag into his day pack. We returned to the river and scouted the camp area with binoculars. No one could be seen, and we retrieved the rest of our belongings. Nothing had been stolen. We ascended back to the plateau, fearing a return of the culprits.

Later, when conducting the diving operations at the resurgence, we descended from the trail at Camarón and had no problems for the remaining three weeks. Noel's theory is that we ran into a group of drunken hunters, apparently from villages on the south side of the river, and that one of them got trigger-happy upon being surprised by our light. In fairness, it should be mentioned that my light might have been provocative. It was a krypton parabolic cave-diving light an order of magnitude more powerful than the hardware-store flashlights they were carrying. Noel conjectured the following conversation on the other side of the river; "Hombre, are you nuts? If they have light ten times as bright as ours, what kind of guns do you suppose they have?" But that didn't make the incident seem any less threatening at the time.

Work at Agua Frío resumed on May 14. Brian, Barb, and I hiked the two kilometers upstream from base camp, through the well-known

narrows, in a little over an hour. Our objective, based on Noel's observations concerning the bottom of the drop, was a tunnel across the top of the shaft. There was a small boulder chocked across the pit that appeared to be a stepping stone to the continuation. I decided to play it safe and rigged a loop of rope to which I clipped in with two Jumars while I tried to knock it loose. I had a Petzl bolt hammer with me and decided to test the boulder while standing on a comfortable ledge. Within a minute or two, there was a whooshing sound and my carbide lamp went out. When everything settled, I found that not only had that boulder disappeared down the shaft, but so had the entire ledge I was standing on. I kissed my Jumars and completed the traverse. We explored and mapped around 100 meters of maze-like passage on the other side, ending at two new shafts leading back down to the river. Given a lack of further options, it was decided that we should have another look at Noel's river, just to be sure. It was a good thing we did.

As it turned out, Noel's sense of direction was 180 degrees off. The going tunnel was actually upstream, away from the entrance and into the mountain. After a short chest-deep stretch, I was out of the water and running up into 10-meter-wide by 20-meter-high borehole. Shortly, there ensued one of the most memorable exchanges of the trip. Brian had now joined me, followed by Barb. She and I were extolling the magnificent gallery before us, yelling "Borehole!" at the top of our lungs. Brian, an extremely adept semiconductor physicist at the National Institute of Standards and Technology and a Yosemite-class rock climber, but a neophyte caver, came wandering up, bemused by all this. "What's a borehole?" he asked innocently. Barb stared at him a moment, before breaking into a grin and explaining, "You're standing in one." After this, every time we broke into a grand tunnel, Brian would chime in, "Borehole!"

Despite this auspicious turn of events, our exploration run was

short-lived, for just a hundred meters further on we ran out of rope at an 8-meter pitch. We returned to camp that evening under a full moon, negotiating the narrows without light. Needless to say, our report generated some enthusiasm, and Noel and Kim quickly signed on for the next push, which took place on May 17. As Paul had just returned from the first push beyond the waterfall room at the resurgence, where he had racked up significant decompression time, he and Jill decided to sit out a day and guard camp. The rest of us began hiking up the river at dawn and entered Agua Frío by 8 A.M. The passage beyond the second pitch narrowed down to an upward-trending bedrock tunnel that soon split into a maze of fissures going down and a series of vertical shafts going up. Ultimately, we scaled 25 meters up the most promising dome and intersected an upper-level walking passage. Soon we came to a large shaft leading some 45 meters back down to a deep lake. The main route, however, continued around the east wall of the shaft, where a rope would be needed for the traverse. Kim, however, located a tight bypass that avoided the exposed traverse. Ahead, the passage opened up into blackness and the first twinge of feeling that we were onto something big.

Kim was in the lead and was the first to reach the lip of the 25-meter pitch that led into the big chamber. When pressed for a name, she came up with the Nevada Room, for her home state. It measured more than 35 meters wide and about as tall and continued 100 meters to the northeast, where it reduced in size to a canyon 8 meters wide and 35 meters tall. There was a massive near-vertical rubble pile descending toward the east side of the room, but we never had time to go down there and investigate it, because the obvious tunnel to the northeast beckoned. There was also a great deal of vampire-bat guano down there, which may help explain our lack of interest. A large roost must have been located on the ceiling right at the start of the chamber,

because there was a several-meter-high mound of shining, dark, slimy guano. However, the few critters we actually saw during our excursions in the cave were fluttering about in the Curandero Room, where they screeched unhappily at us. Following the northeast canyon out of the Nevada Room, we quickly traversed nearly 500 meters of passage, before coming to a highly decorated travertine blockage. Along the way there were several long stretches of ceiling with pristine white helictite bushes 1.5 meters long and 1 meter in diameter.

As we had traversed a substantial amount of virgin territory and it was already 7 P.M., we decided to commence surveying out. Along the way we noticed a number of unexplored leads, some 30 to 40 meters up in the ceiling and others shafts dropping into side passages off the main tunnel. At one point about halfway between the Nevada Room and the formation block, Brian and Noel discovered a 40-meter-deep shaft leading down to water, but since we were out of rope this was just an "audio reconnaissance," based on dropped rocks. There appear to be two prominent levels in the cave, a lower level carrying the river and an upper level borehole some 40 to 45 meters above, with occasional deep collapses connecting the two levels. The lower level was by no means entirely flooded. We had already bypassed three short sumps and traversed significant sections of open river. It ended up being a marathon survey trip, and we did not leave the cave until 7 A.M. the next morning. Brian, Barb, and I then tied in the Agua Frío system to the overland survey point at the Cueva Cheve resurgence, before heading back to camp.

Three days later, on our last day in the canyon, Barb and I decided to return to Agua Frío for an attempt at bypassing the formation block. During a fifteen-hour trip, we scaled three shafts looking for the extension of the borehole. The most ambitious of these was a three-pitch route that led 50 meters up to a collapse chamber filled with

helictites, but no going passage. We also investigated the 45-meter shaft that had been bypassed on the way to the discovery of the Nevada Room. Our rope was too short to reach the bottom, but there was no need for it to, because the shaft changed to a steep mud funnel leading into a deep green pool. Actually, the shaft broke into a large, 100-meter-long by 25-meter-wide open section of river tunnel, which I took the liberty of naming the Maryland Room. The funnel was just the upstream end of the fourth sump. The main upstream route apparently continues underwater in roughly 8- to 10-meter-wide and 6-meter-tall passage. However, neither any of the shafts closer to the end of the cave, nor the collapse in the eastern part of the Nevada Room were investigated. These will be an objective of a return in January 1997. Of course, should all those fail to go, the underwater tunnel is a going route into the mountain for cave divers.

In all, we mapped 1.25 kilometers in Agua Frío. It is an interesting puzzle in the grand scheme of Sistema Huautla. Its location, two kilometers west of the Huautla resurgence, suggests that it is part of some other drainage area. This notion is supported by Jim Smith's thesis, in which he reported negative dye-trace results from Sistema Huautla to the Agua Frío spring. Yet the cave is trending resolutely north, heading toward an intersection with Sistema Huautla somewhere between the present end of San Agustín and Peña Colorada, right there in the area beneath Río Tuerto, where we were so diligently seeking entrances. There is no karst to the west of Agua Frío. Its connection to Sistema Huautla, perhaps by crossing a subterranean drainage divide, would greatly complicate the picture that has been developed over the past twenty years. But wouldn't it be a grand discovery?

A kilometer down-river from our base camp at the confluence of the Peña Colorada and Santo Domingo canyons, Cochrane discovered the Cueva del Nacimiento

Amarillo. It was located right at the head of the trail leading up toward Camarón from the river. This was explored by Sloan, Cochrane, am Ende, and me for 250 meters northward to two upstream sumps in passage averaging 1.5 by 3 meters. Both sumps are large enough to accommodate cave-diving equipment. The cave appears to be heading toward the town of Cueva de los Seres, 5 kilometers distant.

We also returned to Narrows Cave, the prominent railroad-tunnel-size entrance 60 meters above the Río Santo Domingo on the north wall of the narrows, and continued to dig at the end, progressing perhaps another 10 meters in fairly difficult digging conditions before giving up. Sloan, who was at the head, indicated that it was probably not worth returning to, but that the tunnel, plugged with mud to within 10 centimeters of the ceiling, did still continue. We felt occasional mysterious gusts of wind, which reversed periodically, but for the most part there was little to no air movement.

There are at present three open frontiers in Sistema Huautla, not counting Agua Frío. All require very committing diving operations. All of them involve very large tunnels in which exploration was halted for logistical reasons. In order of increasing difficulty, there are:

The active resurgence, already penetrated approximately a kilometer to a depth of 60 meters, but directly accessible from the surface, so that use of electric propulsion vehicles is feasible. A two-month expedition dedicated to this would likely meet with some form of success, given the very large dimension of the tunnel, provided it does not go too much deeper.

Sump 7 in Cueva de la Peña Colorada, beyond six intermediate-length sumps of shallow depth spaced throughout 4.2 kilometers of tunnel requiring two camps. The entrance to Sump 7 is complicated by the 55-meter free drop required to reach it and lack of any ledge at the water's edge. A return here

would require a three-month effort.

Sump 9 in Sótano de San Agustín, arguably one of the largest underwater tunnels yet discovered in Mexico. A return would involve a minimum four-month effort and is not warranted until substantial weight reductions in both diving

and caving equipment can be achieved. Work aimed specifically at this objective is underway. The MK5 rebreather is set to see test dives in December 1996. This apparatus should represent a 40-percent weight reduction compared to that used in 1994. The introduction

of carbon-carbon composite tanks should offer significant further weight reduction.

Plans are underway for a return in early 1997 to Agua Frío and, pending the outcome of that effort, a return to Sump 9 in San Agustín in January 1999.

Expedición Río Tuerto, Oaxaca, 1995

Durante la Expedición de 1995 al Río Tuerto en Oaxaca, el grupo trató primero de encontrar entradas que posiblemente conectaran con pasajes entre Sump 9 (sifón 9) en Sótano de San Agustín y las resurgencias y cuevas del Cañon de Sto. Domingo, incluidos el manantial de tiempos secos y la Cueva de la Peña Colorada. Se encontraron muchas entradas, pero todas fueron tapadas con tierra de erosión de los campos en el área. Mas tarde se acampó en el cañon, cerca del manantial. Por medio de una serie de buceos alcanzaron un puerto a la distancia de 932 metros de la entrada, a la profundidad de 60 metros. El túnel continua, pero lo buceos van a requerir mucho tiempo de descompresión. Cueva del Nacimiento Agua Frío de Mazatlán, localizada mas arriba en el cañon de las resurgencias de Huautla y de Sistema Cheve, fué explorada, y se topografiaron 1.25 kilómetros de los pasajes secos en el nivel superior. Resulta que ahora hay tres buenas posibilidades para encontrar la conexión que falta entre Sistema Huautla y su resurgencia: el túnel de manantial, Sump 7 (sifón 7) en Peña Colorado, y Sump 9 (sifón 9) en San Agustín. Todos ellos requerirán expediciones mayores de buceo.

THREE CENOTES

Sam Meacham, Gary Walten, and Steve Gerrard

It was hard to decide whether the dead boa constrictor we found hanging from the ceiling of our van upon returning from our dive was a good or bad sign. Perhaps proponents of voodoo would have seen it as a sign of good things to come, but it really made Bil Philips and me wonder if we should pack it up for good. Exhausted and still dripping wet, we knew right then that achieving our goal of connecting Calimba to the upper reaches of Sistema Sac Actún would be not easy task. But we didn't realize that the tiny passage we were searching for would be a trail winding not unlike the unfortunate snake.

Cenote Calimba, Sweet Chimes, so named because of the musical formations at its entrance, is 332 meters west of the Grand Cenote on the Cobá Road. Bil first noticed it in January 1996. He returned in March with Missouri cave divers Kurt Olsen and Mike Huesack, and they laid the groundwork by laying in the spring and siphon sides of the cenote a total of 258 meters of line. Passages were middle-sized, with exquisite decorations. The upstream section drips with helictites the likes of which they had never seen. Recognizing similarities with Sac Actún, Bil made the logical assumption that the caves were connected.

Nancy DeRosa in Cenote Sac Actún, Quintana Roo.
Steve Gerrard.

Portions of this article appeared, in somewhat different form, in *Underwater Speleology*, volume 23, number 4-6, 1996.

In order to search for the connection, we employed Jim Coke and Tom Young's accurate and painstakingly detailed map of Sac Actún. With the help of Gary Walten, we made an overland survey from the Grand Cenote entrance of Sac Actún and superimposed Calimba to see where it fell. Immediately we saw exactly what needed to be done. If our figures were correct, Jim and Tom's line in Sac Actún was a mere 30 meters from Calimba. Unfortunately, it looked like 30 meters of solid rock. Heavy silting and major restrictions results in called dives, but finally I noticed a small crack in the ceiling, and we were able to squeeze through. Beyond, we wound our way up, down, around, and back through more than 40 meters of restricted passages. Using a compass for orientation was difficult. At times we were headed in the right direction, but more often the passage seemed

to take us aimlessly further from our target. The area we were pushing was respectfully named The Boa Constrictor. At length, we broke into a larger, very Sac-Actún-like area, and our eyes widened and heartbeats quickened as our lights swept back and forth, hoping to spot the end of a line. Our hopes were answered 30 meters further southeast, for there quietly lay the end of the Sac Actún line.

In four dives, 621 meters of line was added to what we consider the most beautiful cave in the Yucatan. Although this pales in comparison to the discoveries and efforts of the original Sac Actún explorers, it was exhilarating to be able to contribute more passage for everyone to enjoy in Sac Actún, the White Cave.—*Sam Meacham*

Cenote Chac Mol is one of those opportunities that comes along once in a great while: a real



Billy Pugh and Connie LoRe in Sac Actún. Steve Gerrard.

drive-up, jump-in cave system with gin-clear water flowing through large passages and speleothem-encrusted rooms. For my wife Kay and me, it was some of the easiest exploration we have ever done.

On May 21, 1996, we noticed a small sign on Highway 307 one-half mile south of Puerto Aventuras, Quintana Roo. On it was a crude painting of a jaguar sitting over a cenote, and the words Cenote Chac Mol were written below. In Mayan, *chac mol* is jaguar. We pulled in to inquire and were granted entrance for ten pesos by the owners. They had just completed the road to the cenote, a mile and a half into the jungle. The owner's young son jumped in the back of my truck and rode in with us. Perhaps we were the first gringos to drive down their new road. We parked, got out, and walked over to the lip of a rock overhang above a crescent-shaped pool. Grinning ear to ear, we had a quick look around, and we returned home making plans to come back and dive the next day.

Boom! Two exploration reels empty, 585 meters of line surveyed upstream against flowing fresh water. Passages about 20 meters wide on average, a large cavern area within sight of the entrance, and several large rooms. This is what cave-diving explorers dream about: easy in and out, warm, shallow, virgin borehole. After all those long walks pushing Dos Ojos further upstream into the jungle, this new cave was just too easy.

The next day, we added 568 meters more upstream. DPVs and stage-bottles took us to the end of our previous line, then we just tied on and went. Two more decorated rooms and a large cenote, later named Cenote Pascal, 900 meters from the entrance. The next 155 meters were restricted and silty, as we tried to get around the cenote collapse and back into borehole. We tied off at a side-mount restriction, with flow still blowing in our faces. Low visibility and cheese-grater squeezes made surveying on the way out a challenging chore. I was



glad we had taken the time to secure our line properly and avoid line traps. The silt was quite nasty. When we got back to Cenote Pascal, I realized I had breathed a bit more air than I had planned, so I stopped surveying there. We surfaced, discussed our options, and decided to survey the rest of the line another day. This reduction of tasks and the current made for a simple ride back to the DPVs and stage-bottles. During the swimming and scooting out, we looked around for side passages. There were very few, although you would think big passage like this would be have lots of infeeders. Apparently all the water flows down the main tunnel.

On May 25, we decided to give the passage downstream from Chac Mol a try. This time we both took stage bottles with us right off, since we were following a siphoning current and already knew that we had big cave on our hands. Swimming over to the drain side of the cenote, we noticed a guideline and followed it. It went east and ended approximately 60 meters in, just out of sight of the entrance. Kay and I just smiled. We backtracked to the entrance, tied off the first of our two reels, and followed the fresh-

water current south as it rippled above the salt-water zone below. After 764 meters, we ran out of line. We had discovered more large passages and rooms, darker now, with offshoots and a spectacular drop-off where the ceiling is less than 10 meters deep and the floor is at 30 meters. It is in this area, approximately 500 meters downstream, that the Cauac-Nah Room, the Monster's House, is located. It is a small, arched opening that unfortunately ends right away, but above it is a spectacular 13-meter-long group of stalactites we named Xix-Ha-Tunich, Mayan for Drip Water Stone. We believe this is the longest stalactite yet discovered underwater in this area along the coast.

The total was now 1972 meters of line in three dives. For decompression, only safety stops were needed. Easy pickings. More line was laid on subsequent dives, with less impressive results. Some other divers have also added line to the system, both in a new area and off our original lines. A connection had been made to a downstream cenote and cave called Mojarra, which is quite extensive as well. Cenote Mojarra is located along the road in to Chac Mol, and this gives a

thousand-meter traverse with a reasonable exit on the downstream end. The whole system is headed toward the Chacalal Caleta, an inlet located south of the South Marina at Puerto Aventuras, where we feel confident the majority of the water is flowing into the Caribbean Sea.—Gary Walten

With its ominous name taken from the hit movie by Steven Spielberg, Cenote Temple of Doom is a favorite of all cave divers who have had the opportunity to visit it. Don't let the name fool you, for within are some of the most wonderful treasures of the new frontier. First discovered and explored by Mike Madden and his then brother-in-law Denny Atkinson in July 1986, this cave was found by following up a tip from a taxi-driver in the village of Tulum. Many of the Mayan people in the area were already familiar with it and called it Cenote Esqueleto, for the skeleton of a young Mexican who was killed in a machete fight and dumped in the hole, or so the story goes.

The first dive produced 500 meters of surveyed passage in what was only the third cave system known in the area at that time, after Cenote Carwash and Cenote Naharon. The two divers were ecstatic about the big rooms and pristine, white walls they saw in the crystal-clear water. As stories began to drift out of the jungle about the virgin cenotes, interest in exploration in the area began to grow. The discovery of the Room of Tears in Cenote Carwash by Madden and Parker Turner fanned the flames. Cave divers Paul DeLoach, Tara Tanaka, and John Zumrick arrived in the new frontier. Paul and Tara had visited Cenote Carwash during the summer of 1985, and Tara once told me that she had seen the hole, eventually known as the Madden-Turner Passage, that led to the Room of Tears, but did not follow it. The three knew that this new area was going to be a gold mine for cave-diving exploration,

Connie LoRe in Sac Actún.
Steve Gerrard.

and they explored in the Temple of Doom and added 758 meters of line. Paul DeLoach told me later that it was the prettiest cave he had ever seen, even ranking over Sally Ward Spring in Wakulla County, Florida, which was one hell of a compliment.

The most impressive feature is the immense Fang Room, comparable in size to a football field and with a stalactite 6.7 meters long and 2 meters around hanging right in the middle of it—a tooth that would make Dracula jealous. The start of the main passage is called the Ma-

donna Passage, because as you enter the blue water of the pure white tunnel, two brown stalagmites stand toward the right side, one in the shape of the Madonna (not the rock star). What a way to start a dive!

Word of the Temple spread, and, as more cave divers journeyed to the Akumal-Tulum area, it quickly evolved into a popular tourist cave. Everyone was impressed. Originally, you could expect a blizzard of percolation of material from the ceiling disturbed by exhaust bubbles, but,



as time went on, this dissipated. Today, at least in the popular passages, percolation is almost nonexistent.

For several years after the discovery of the Fang Room and a second hall known as the Coliseum, there was little new exploration. Then, having become enthralled with the beauty of the diving in the area during a visit the previous year, in the summer of 1992 Carl Sutton, from Gainesville, Florida, dedicated himself to resurvey the cave and produce a map of this cave to add to the maps of Naharon, Carwash, and Sac Actún already drawn by the talented Jim Coke and his Quintana Roo Speleological Survey. Encouraged by Jim Coke, Carl spent three months diving the Temple in the company of many other divers. He collected survey data, actually taped many of the prominent passages [many underwater caves are surveyed by

measuring the distance with a knotted guideline], and worked to produce a map as accurate as the others. Many of us eagerly awaited the result. Unfortunately, Carl died in early March 1993 during a deep dive in Cenote Ucil; he succumbed to oxygen toxicity in the dangerous depths. (Sheck Exley and Paul DeLoach had dived this cenote a year earlier, and Exley, diving with trimix gas, had reached the bottom at 130 meters.) This could have ended the momentum for a new map. In memory of Carl's dream, Jim picked up the ball, sorted out Carl's notes, and carefully reviewed the drawings already begun. Painstakingly, Jim drew the map and published it in the fall of 1993. The name on the map is Cenote Esqueleto, as Carl firmly believed that all cenotes should bear their local names. But within the cave-diving community the name Temple of Doom will probably always stick.

Either way, the map is a winner, just as the cave is.

During October and November 1995, diver and instructor Gary Walten really pushed the Temple. With the help of his wife Kay and Sam Meacham, he added over a thousand meters of new survey, and the cave continues to yield new tunnels, with a current total of 4000 surveyed meters. Gary had been motivated when he and Kay established a long circuit dive in the system for his guiding and teaching business. They realized that more passages were waiting, and "if you don't go, you won't know." Gary, Sam, and Kay performed four exploration dives, resulting in a new cenote entrance and more leads to push. It seems that the Temple of Doom just keeps on going. It will always be a favorite of cave divers, some of whom strongly feel it is one of the best underwater caves.

—Steve Gerrard

Tres Cenotes en Quintana Roo

Cenote Calimba, que fué descubiertó en enero 1996, se ha conectado con el sistema Sac Actun, agregandole 621 metros. Cenote Chac Mol, el Cenote del Jaguar, fué explorado primeramente in mayo de 1996. Los pasajes grandes fueron explorados hasta una longitud total de 1972 metros durante tres buceos. Chac Mol se conectó con Cenote Morharra, proporcionando una distancia total de travesía de 1000 metros. Cenote Temple of Doom, también conocido por su nombre local de Cenote Esqueleto, era de las primeras cuevas descubiertas en el área de Tulum y Akumal, y se siguen encontrando pasajes nuevos. Mas de mil metros se añadiéron a la cueva en 1995, que hace a ésta, 4 kilómetros de longitud y es considerada entre las cuevas subacuáticas mas hermosas.

Reprint

BALANKANCHE, THRONE OF THE TIGER PRIEST

E. Wyllys Andrews IV

This is a reprint of Chapter I, "Introduction," pages 1-8, in the book with the above title, publication number 32 of the Middle American Research Institute, Tulane University, New Orleans, 1970. I have left out the numerous references to the book's bibliography and some of the references to other parts of the book—editor.

About 4 km. west of Chichen Itza, and 300 m. north of the present highway from Chichen Itza to Valladolid, is the small ruined site of Balankanche. The remains consist only of a rough quadrangle of platforms varying in height to about 3 m. All construction I saw was the product of the Florescent period. The vaulted buildings were characterized by lower walls faced with crudely cut blocks, heavily spalled and more deeply tenoned than customary in this period, a characteristic also of contemporary architecture at nearby Chichen Itza. The vaults were faced with finer blocks, with the familiar "boot"-shaped tenon. The façades were of more finely dressed or carved stone.

A number of the buildings were in excellent condition when I visited the site in the 1930's, but by 1954 the stone robbers who are working such unremitting havoc among Yucatan archaeological remains had invaded the site, removing most of the substructure facings and apparently all but inner wall fragments of the structures above. Since that time the remainder of coherent architectural remains have vanished into the stone crushers which have provided materials for the new highway nearby.

Surface pottery, and a single ceramic trench dug by E. M. Shook

and R. E. Smith of the Carnegie Institution of Washington, showed a long period of occupation, but was recorded as predominantly Pure Florescent. Actually, as we shall see below, the surface remains may well date from the Modified phase of the Florescent.

In the center of the plaza area framed by the quadrangle of structures described is the entrance to the cave, surrounded by a massive circular wall of dry masonry.

From the center of the circular walled area on the surface, the entrance passage descends abruptly to a depth of about 10 m., then branches off in every direction. The carefully explored parts of the cave contain more than a kilometer of passages, and there is probably at least another kilometer, perhaps much more. The passageways vary considerably in form and size. Sometimes they are broad, flat tunnels as much as 10 m. wide and 5 m. high. Occasionally they narrow until no longer passable. That many were at one time waterways is clear from the beds of deep red clay and *sahcab* of varying consistency and depth.

The water table, reached in at least four places in the cave, was 23 m. below the surface in October 1959, at the end of the rainy season. We do not know the extent to which it varies with the seasonal rains. It is clear, however, that there have been basic changes in the last thousand years. At least one of the larger chambers and a long connecting passageway which about A.D. 900 were dry areas used for ceremonial offerings, are now 1-2 m. under water the year round, and have re-

mained so continuously in the five years since our excavations.

The passageways are interrupted occasionally by large domed chambers, as much as 10 m. tall and 25 m. wide. Usually in caves of this type the tops of some of these domes have caved in, giving light, ventilation, and added access to the subterranean areas. However, at Balankanche, although in the tallest of these domes a few roots from some trees on the surface have penetrated the roof, none have actually collapsed, nor were any vents or additional entrances found. This was a cause of serious hardship to us, because the oxygen consumption of even our small crew over an 8-hour day considerably exceeded that which could be replaced by diffusion along the restricted entranceways and by the faint drafts caused by temperature and pressure changes on the outside. Correspondingly, the humidity increased sharply as the water table was approached, reaching a relative value of 100 in most of the area where we worked.

On the roof, walls, and floor of the passageways, particularly in the domed chambers, were intermittent stalactitic and stalagmitic formations, sometimes joined in massive columns and often of striking beauty.

Literature on the geological history and ecological functions of the Yucatan caves is sparse. The historical geology of the region is very generally covered by Cole [reprinted in *AMCS Activities Newsletter* 21], Schuchert, Sapper, Robles Ramos, and West. Modern studies by Mexican geologists (notably J. Butterlin and F. Bonet,

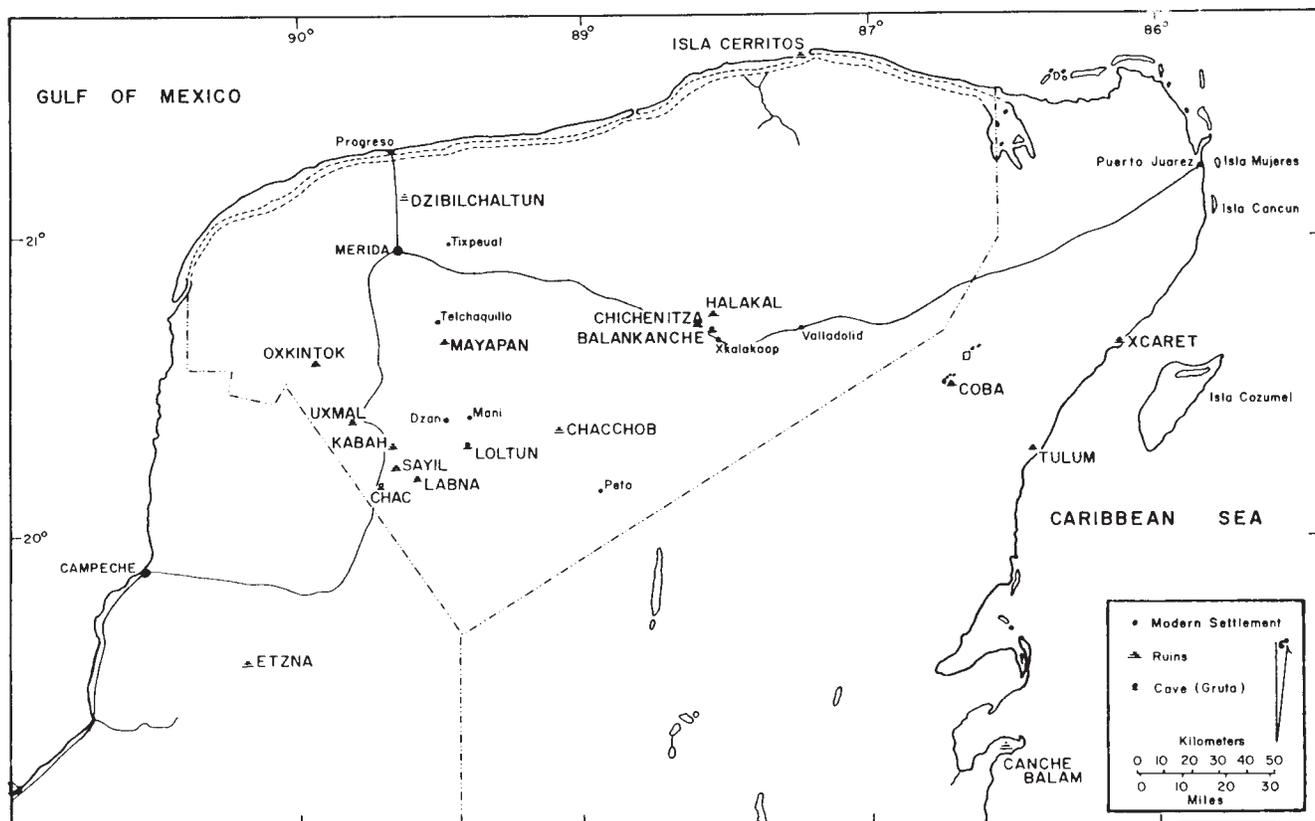


FIG. 1—MAP OF THE NORTHERN YUCATAN PENINSULA SHOWING LOCATION OF THE GRUTA DE BALANKANCHE

whose results are not yet generally available in print) have tended to indicate a more recent emergence of larger parts of the northern coast of the peninsula in Pleistocene times (a period previously reserved for the formation of the coastal sand bars now inhabited by almost the entire population of the north coast of the peninsula). Mercer's *The Hill Caves of Yucatan* contains a wealth of descriptive data, as does E. H. Thompson's paper, "The Cave of Loltun," on a more restricted subject. Results of a recent study on the karst geography of the area by William A. Finch have not yet appeared in print.

The Grotto of Balankanche has long been known to science. The first recorded explorations were made by the party of A. S. Pearse in June 1932 in the course of their biological studies of the Yucatan cenotes, and again in 1936 during their study of the fauna of the Yucatan caves. In 1933 I made numerous visits to the cave, partly to examine the archaeological re-

mains and partly, in the course of assembling a herpetological collection for the Chicago Natural History Museum, to search for what looked like a blind, white water snake which appeared in one of the many water areas of the cave but eluded capture. Nor was the snake collected during the present expedition, although the cave produced other zoological treasure.

In the lake beyond Chamber 3, we caught topotypes of the rare and completely blind Brotulid fish *Typhliasina pearsei* (Hubbs), a new genus and species described by Hubbs on the basis of two specimens obtained earlier by Pearse in this cave and not yet found elsewhere. This remarkable fish, most closely related to deep-sea salt water cousins, is believed by Hubbs to have evolved in the Yucatan caves where, in perpetual total darkness, the eyes atrophied and eventually disappeared as external structures. Another blind fish of strongly ophidian appearance, *Pluto infernalis* Hubbs, was very probably the "snake" we had tried so hard to

capture at Balankanche in the 1930's. It also is unique to Yucatan. We also came upon rare cave shrimps, such as *Creaseria morleyi* (Creaser), paratypes of which were found by earlier expeditions to the cave. These, like the *Typhliasina*, are more closely related to maritime shrimps than to freshwater varieties in the area, and indicate remote migrations from the ocean to populate these underground rivers.

Another cave denizen which added more than a little excitement to our life was a very large myriapod, which seemed in the darkness to have two heads, an appearance exaggerated by its motion when cornered: it rushed forwards or backward at frightening speed, attacking any objects which seemed to threaten it and leaving a sprinkling of venom-looking clear liquid where it tried to bite. We and the Indian workers were terrified by its awesome appearance and aggressive habits. They called it *u-dzudz-mitlan* ('the kiss of hell') in Maya, and said that it spouted venom from fangs at

both ends as well as from its myriad punctate feet—either and all probably deadly. Once we succeeded in capturing one in a mason jar we chuckled (in some relief), regarding the native diagnosis of lethality like that attributed to the friendly gecko and many harmless snakes. We were a bit taken aback when informed later by responsible biologists that this was a species of

Scolopendra, normally an inhabitant of caves in far northern Mexico, which was indeed venomous to the point of fatality.

Earlier visitors to the cave gathered considerable samples of surface pottery, with which the outer reaches are generously covered, depositing them with the Carnegie Institution collections at Chichen Itza. Later, the cave was visited by

E. M. Shook and R. E. Smith of the Carnegie Institution of Washington, who dug stratigraphic trenches and made surface collections both inside and outside the cave. Their findings are discussed below.

In *The archaeological ceramics of Yucatan* George W. Brainerd illustrates a number of items from Balankanche.

José Humberto Gómez had made the systematic exploration of the cave his hobby for almost 10 years, spending some 1000 hours at this underground pastime. Only after this much time did he discover what seemed to be a false section of the wall of one of the chambers. This, on examination, turned out to be crude masonry sealed with mortar, and it covered the small accessway to the newly discovered chambers. Previous speleologists with varying motives, including myself, must have come within a few feet of this hidden entrance. One clearly modern test trench was not more than 10 m. away.

During our first midnight explorations, the cavern looked like a juicy archaeological plum, which indeed it is. But had I realized the magnitude of the job to be done in the five weeks before our deadline at Dzibilchaltun, or the work load that would remain once our part of the field operation was completed, we would have hesitated in suggesting collaboration. The job accomplished is outlined below.

Considerable exploration remained to be done in the chambers found by Gómez. All members of the group worked at this task, and two of the tortuous (and in one case submerged) passageways followed

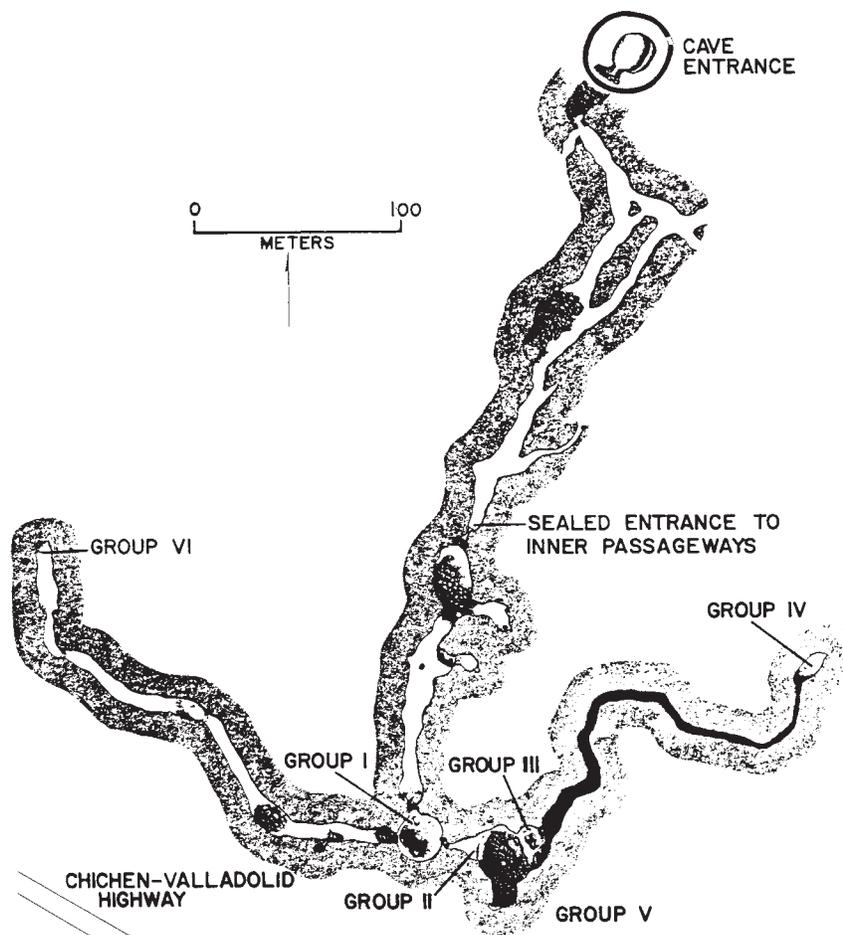


FIG. 2 — PLAN OF GRUTA DE BALANKANCHE
A number of passages branching off the descent to the sealed section of the cave are not shown. Drawing by George E. Stuart.

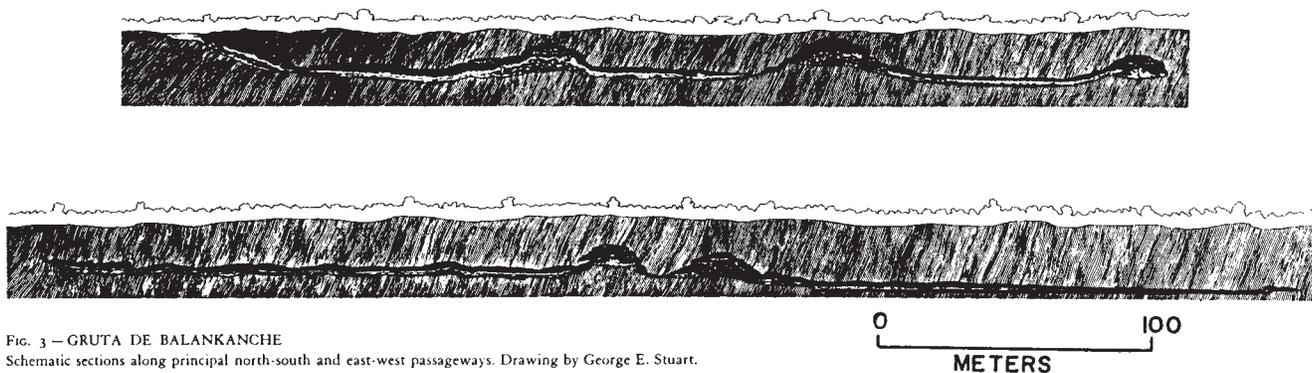


FIG. 3 — GRUTA DE BALANKANCHE
Schematic sections along principal north-south and east-west passageways. Drawing by George E. Stuart.

up led to new discoveries. It is not our belief, however, that the job may be considered finished; very possibly the sealed area may contain major groups of offerings, and sealed off elsewhere in the cave may be equally large undiscovered areas.

The topographic job fell to George E. Stuart, who, in addition to mapping the cave and drawing the sections presented here (figs. 2, 3), prepared the detailed diagrams of the individual groups of offerings to show the exact original position of each of the more than 500 artifacts. Concurrently, I compiled a descriptive catalogue of the finds as they were numbered.

Most of the larger pieces of pottery, principally the large effigy censers and studded biconical censers, were in such delicate condition that it seemed wise to number them and leave them in the cave. Too many would have been smashed had we removed them for processing. Preliminary scale drawings were made of these by George Stuart and Hipólito Sánchez under most difficult conditions, often in darkness working with a single flashlight. Other more portable pieces were removed to our quarters, where Sánchez spent most of our short season making the final drawings of the 20 stone censers, the carved spindle whorls, and a large proportion of the miniature pottery vessels.

Much of the pottery already smashed in the cave was brought back to our Merida laboratory, where Eduardo Toro spent three months on the pieces which could be reassembled or restored for return to the cave. Those damaged beyond restoration and the numerous nonoffertory surface fragments, probably originally brought into the cave as sherds, have been kept in a study collection and will be available to the student, along with other such collections at the Instituto Yucateco de Antropología e Historia, in the study quarters above the new Merida museum. Here some representative offerings from the cave are now on exhibit, and a similar small selection has been removed to the Museo de Antro-

pología in Mexico City.

Gene Stuart spent from late September 1959 to February 1960 making final drawings of the preliminary ones produced in the cave, and drawing the numerous specimens and sherds which passed through the Merida laboratory. Several days were spent at Chichen Itza in establishing and checking color values for the paintings published in this report.

Richard Stuart undertook the difficult task of photographing *in situ* the many artifacts left in the cave; he also photographed at our laboratory the specimens removed for processing or storage. In addition to general photographic recording of the cave, he did extra duty on the ethnological aspects of the project.

William Folan and Victor Segovia, in addition to keeping the dig running, did the excavation, stratigraphic and otherwise, which this unusual project required. The mixed deposits of charcoal, mud, and broken offerings at Groups 1, 2, 3, and 4 were excavated meticulously and sifted where feasible, the latter yielding a considerable number of tiny offerings. They also dug the two stratigraphic pits inside the sealed chambers. Segovia, on almost no notice, managed to secure—and to operate—the electric tape recorder which yielded the unique record of the lengthy native ceremonials in the cave.

When Gómez discovered the sealed chambers, the accessways were dangerous and were passable with only the utmost difficulty. Living conditions inside were made impossible by darkness, complete lack of ventilation, and 100 per cent humidity. Thick cardboard boxes brought in during the morning would be useless by afternoon for taking out specimens. Even with less than 15 men in the large inner chambers, the oxygen became exhausted in an 8-hour day, leaving the workers panting, after a minimum of exertion, as if they were atop a tall mountain peak.

As our plan from the first had been to leave the interior *adoratios* as nearly as possible in their original condition as a public monu-

ment, much of our work from the start was in the creation of passable accessways and the improvement of interior conditions in the cave. As a start, after about 10 days' work, Fernando Barbachano rented a 2-kilowatt generator, and his mechanics installed electric lines which brought a vital modicum of light to the principal interior areas where we worked. This has now been replaced by a 5-kilowatt generator furnished by the Instituto Nacional and wiring in heavy cable which carries full current to all chambers and passageways now open to the public.

At the start of our work we combed the local area for *canteros*, or well diggers, and were soon amazed at their progress in opening up the rock formations. The primary entrance to the new chambers was for many meters less than 30 cm. high and 60 cm. wide, making it impossible either to turn on one's side or to make effective use of knees or elbows in wriggling through the muddy channel of rock. This was enlarged sufficiently to walk through. Other passages were opened, and steep rock surfaces which at first could only be climbed with a rope were soon ascended by neat stairways cut in the stone. Ramps were built over difficult areas, and paths were outlined in white stone on the flat floors of the dark passageways between the domed chambers. This work was supervised by Raúl Pavón, whose real job began about the time the rest of us left the cave.

Pavón, drawing on museographic experience in his own museum at Campeche, stayed on through November and part of December, transforming the cave into a unique subterranean archaeological museum, applying modern lighting techniques to exhibition of the specimens, and taking necessary care to protect the exhibits from a sometimes careless public while he protected the public from mishap on their tours. The Gruta de Balankanche is now open to the public as a national monument.

Early in the project we were contacted (through Folan) by the *h-men* of nearby Xcalakoop. (The *h-men*

TABLE 1 — DATING OF SHERDS FROM OUTER CAVE

PERIOD	BC-1		BC-16-1	BC-16-2		TOTAL
	Number	Percentage	Number	Number	Percentage	
Formative or Early, Phase 1	13	6	75	86	100	174
Early, Phase 2 or Pure Florescent	14	6	51	0	65
Modified Florescent	210	87+	172	0	382
Decadent or Early Colonial	1	1-	1	0	2
<i>Total Identified</i>	238		299	86		623
<i>Unidentifiable</i>	22		35	0		57
TOTAL	260		334	86		680

Identification of numerical groupings:

BC-1: general surface material from outer cave.

BC-16-2: sealed material in mortar of second wall closing passageway.

BC-16-1: unstratified material from area adjacent to wall, heavily weighted by early material in mortar of collapsed portions of wall.

Note: As BC-16-1 and therefore also the total do not represent pure samples, percentages calculated within these categories would not be distributionally significant.

is the practitioner of the native folk religion and magic which has survived into Catholic times.) He informed us that, because of the sacred nature of the cave, it would be necessary to perform various rituals to propitiate the cave deities and escape the danger of supernatural retribution for our profanation. He named the ceremony *Tsikil T'an ti' Yuntsilooob*, which means "Reverent message to the Lords." We were delighted, of course, and told him to make the necessary arrangements. The renowned Mayanist, Alfredo Barrera Vásquez, Director of the Instituto Yucateco de Antropología e Historia (I.N.A.H.), answered our emergency summons and came from Merida to describe and annotate the observances. [The book includes in a long appendix the Mayan text of the ceremonies, as well as a translation into Spanish. The book includes, in a pocket inside the back cover, a small 33 1/3 RPM record with a sound recording of some of the chants.] If the multiplicity of references [in the description of the ritual] to the offering and consumption of *saka'* seems repetitious to the lay reader, this must be blamed on the h-men, not on Dr. Barrera Vásquez. Besides the 17 uninterrupted hours of moist and, finally, almost oxygenless discomfort in the blackness of the cave, our major act of contrition during the ceremonies

was the enforced and almost endless consumption of this sickly sweet ritual grog.

Romualdo Ho'il, the h-men, took great pride and delight in the torrential rains which fell on the area immediately after his propitiation of the rain gods; his local prestige must have been enormously enhanced by this almost frightening token of his thaumaturgic manipulations. One wonders if he would have been more or less pleased had he known that this was the great hurricane of 1959, which killed so many and devastated so much as it swept across the Yucatan Peninsula.

A major satisfaction in the course of this project was the complete, cordial and effective cooperation of three institutions involving two countries. Members of the expedition from the Instituto Nacional de Antropología e Historia and the Instituto Yucateco de Antropología e Historia, the Middle American Research Institute of Tulane University, and the National Geographic Society worked enthusiastically together as a single team. It is hoped that the successful completion of this project will pave the way toward future similar collaborations.

At least four passages of the unsealed outer section of the complex cavern lead to underground water pools. This was one of the

principal reasons for the cave's long period of use, for in this area, where the water table lay 20–23 m. below the surface, water was obtainable only in the rare caves and cenotes which were open to this depth. The primary passages are strewn with a wide range of pottery, indicating either a habitation area, or an area where water may have been sought in a variety of handy vessels not made for that purpose. The collections are not predominantly fragments of water jars, as is, for example, the case at the Gruta de Chac, where fragments of other forms are nonexistent. The deeper reaches of the grotto contain apparently different material, falling into two categories: (1) spindle whorls, or artifacts of value, which might indicate dedicatory offerings left along narrow passageways which led to water, and (2) large sherds of broken bolster-rim basins or large jars used as excavating tools in the abundant pre-Columbian excavations in clay and mineral beds.

No ceramic excavation was undertaken in the outer parts of the cavern, with a single exception. But a considerable collection of surface pottery and unstratified remains was obtained during our explorations and the construction work along the accessways to the new find. This collection (cf. Table 1) gives a clear picture of the general outlines of human habitation in or use of the cave. About 6 per cent of the sherds date from the first phase of the Early period or before. This includes specifically the pattern-burnished wares diagnosed as the earliest of the known Yucatan Formative wares, straight-sided, thin-lipped, slipped monochrome bowls reminiscent of the Peten Mamom, monochrome bowls with flaring sides and thick everted lips characterizing the Peten Chicanel phase, the incised dichrome complex suggested to be transitional between Formative and Early periods, and Peten-like basal-flange bowls characterizing the first phase of the Early period. Another 6 per cent is identifiable as the second phase of the Early period, and the first phase of the Florescent, indicating

relatively greater use of the cave during this much shorter span of time. However, the overwhelming bulk of the pottery is assignable to the second (Modified) phase of the Florescent. Later came scant traces of occupation during the Decadent period in the form of Mayapan redware and the supposedly post-Mayapan "granular redwares."

The entrance area of the cave is surrounded by a circular stone wall of dry masonry some 35 m. in diameter. The wall is 2 m. thick and approximately 2 m. high. As no excavations were made in the wall, it remains of unknown age. Inside the entrance at distances of 30 m. and 110 m. the principal passageway was blocked by walls of crude stone laid in thick mud presumably scraped from the nearby cave floor. Funk's brief excavations of the first of these walls produced a sealed sample of 86 sherds. This sample contained none of the easily identifiable slatewares (which extend back into the first phase of the Early period). Most of the sherds were Formative monochromes; the latest identifiable material consisted of 18 sherds of incised dichrome jars, dated by Brainerd as the Formative-Early period transition.

Several striking facts emerge.

The cave was at least intermittently used from the earliest known period until shortly before the Spanish conquest, a span of approximately 3000 years. The function of the wall just mentioned may have been either defensive or ceremonial, but the associated ceramics establish that for at least the second half of this long span, from approximately 0 A.D., the cave was used for more than merely a source of water.

During the Modified Florescent period, that of the strong continental Mexican influence and probably dynastic occupation of nearby Chichen Itza, deposition of remains increased astronomically at the cave. The Modified Florescent was clearly the period of the most intensive use of the cave—which fits well with our dating of the material in the sealed chambers.

Shook and Smith's 1954 ceramic studies led them to identical conclusions regarding the early history and length of occupation of the cave. But, in striking contradiction to the evidence noted above, they state: "The pottery within the cave, like that recovered from the ruins, showed a long range of occupation. Most abundant on the surface of the cave floor was Puuc Medium

Paste Slate ware of the Late Classic Period, and there were a few sherds of the Toltec-Chichen, Mayapan, and Post-conquest Periods." In view of the size of the two collections thus conflictingly interpreted, a sampling error could not possibly be responsible for the discrepancy. We can only guess that the earlier collection was rich in some common slateware shapes actually of Modified Florescent age, but interpreted as belonging to the pure phase of that period.

The ruins above the cave are not important in themselves, and further excavation would probably not be warranted. However, by interpolating strictures in the preceding paragraph, we may assume that they may also date to the second rather than to the first phase of the Florescent. Both ceramic and architectural techniques of the two phases are very similar and easy to confuse in fragmentary material.

After the close of the Modified Florescent, use of the cave was abruptly curtailed, the fragments of Decadent redware and "granular red" having probably been left by occasional travelers or *milperos* using the cave for water or temporary shelter.

Balankanche

Este capítulo de un libro publicado en 1970, describe las investigaciones arqueológicas en las Grutas de Balankanche, cerca de Chichén Itzá, Yucatán. Durante el proyecto, *h-men* del lugar presentaron ceremonias religiosas dentro de la cueva en la lengua Maya. La cerámica que se ha encontrado en la cueva indica que se ha usado por unos 3000 años, hasta un poco antes de la conquista española.

