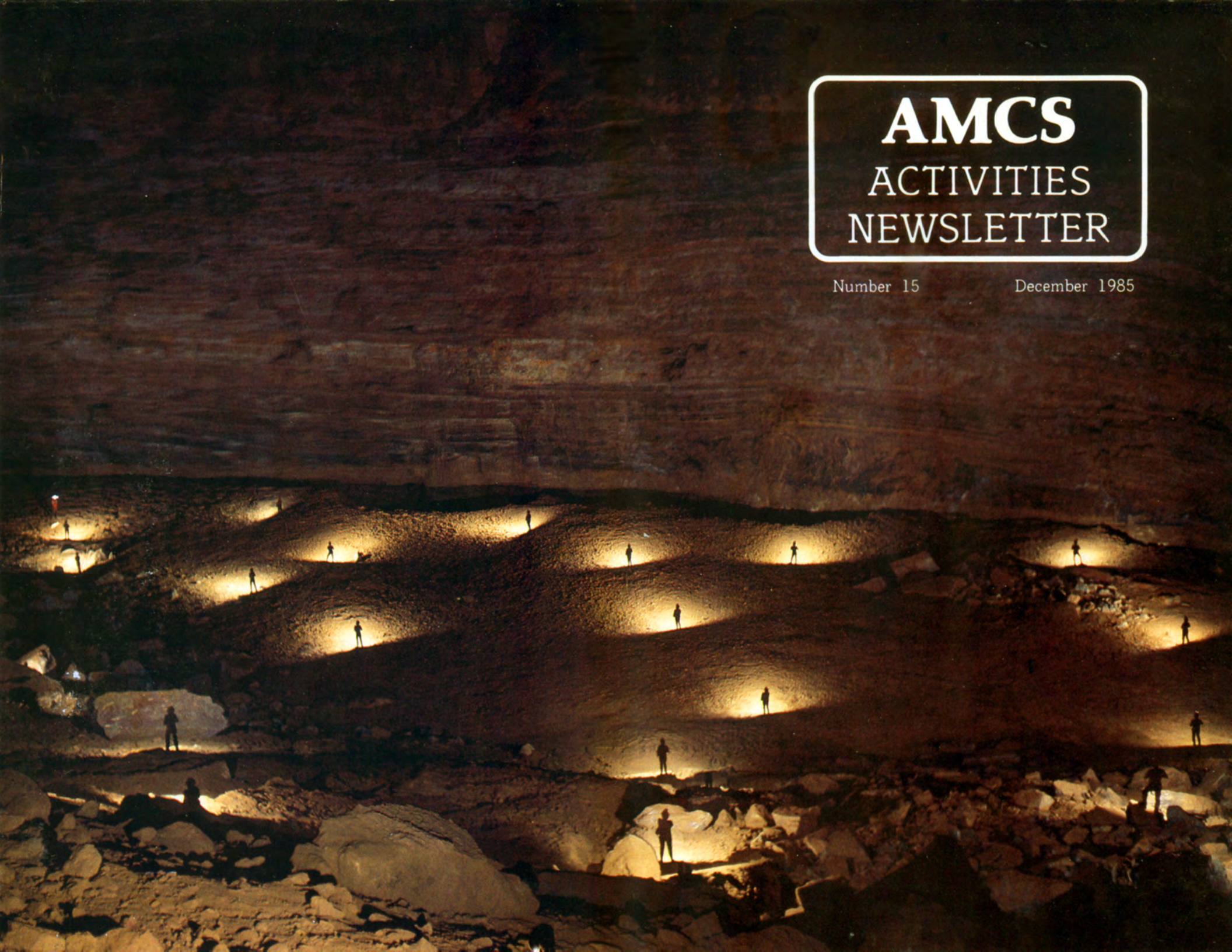

AMCS ACTIVITIES NEWSLETTER

Number 15 December 1985


MÉXICO
PLACES IN THIS ISSUE
PURIFICACION
SAN MARCOS
XILITLA
CARDONAL
CENOTILLO
TOXIN
TENERIAS
HUAUTLA

AMCS ACTIVITIES NEWSLETTER

Number 15 December 1985

Publisher
Association for Mexican Cave Studies
with assistance from
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Translations
Peter Sprouse, Pablo Tapie

Contents

The AMCS Activities Newsletter is published by the Association for Mexican Cave Studies, a non-profit group dedicated to the conservation and study of the caves of México. Articles, maps, and photographs on caving and speleology in México are solicited. A list of publications and prices is available on request.

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EDITORIAL

We're ten years old! AMCS Activities Letter No. 1 appeared in January 1975, an eight page photocopied collection of trip reports from the preceding months. Highlighting that first issue were the deep pits discovered along the new Otates Mine road in the Sierra de El Abra. Born of the need for up-to-date news on Mexican caving, it has evolved into the newsletter you now hold in your hands. It is less timely perhaps, but we feel that it's become one of the world's finest caving journals. Many thanks to the contributors who send in the material that keeps it going. Especially welcome are the increased number of articles we are receiving from cavers in México.

Parallel to the development of the Activities Newsletter has been the evolution of project caving in México. After years of ranging far and wide, cavers in the mid-1970s began to concentrate on specific areas, resulting in the exploration of major cave systems such as those in Huautla, Purificación, and elsewhere. The intense activity in these areas is the source of a tremendous amount of information in the form of cave maps, descriptions, and exploration accounts. Due to space limitations in this publication, only an outline of each expedition can really be given. The complete results of these large caving projects can only be properly presented in an in-depth (excuse the pun) bulletin on each area. Although drafting cave maps and writing descriptions years after the trip can be less than exciting, it would be a great loss to speleology if the results of all that fine caving were never recorded. The AMCS Bulletin series, although inactive lately, is well suited to fill that void.

the Editors

Cover Photo: Anthodite Hall in San Agustín, lit by 25 flashes. (Keith Goggin)
Frontispiece: Entrance to Cueva del Tecolote. (Terry Raines)
Back Cover: Karen Rosga in Sótano de San Marcos. (Jim Pisarowicz)

México News

CHIAPAS

The first Dutch expedition to México visited Chiapas from December 1984 to February 1985. A total of 7 kilometers of new passage was explored in 80 caves, most of them new. Eleven cavers participated, although three of them were only able to stay for three weeks.

In Veshtucoc, previously explored by British cavers, they extended the cave to 4900 meters in length and reached a height of 380 meters, at a point 100 meters below the surface. The new section was discovered by pushing 40 meters down through an unstable breakdown choke. Then they picked up a continuation of the cave stream, which they followed to a deep sump. In all, 1300 meters was added to the length of the cave. In Cueva de Ojo de Agua, a resurgence cave with three cubic meters per second of dry season flow, they found 60 meters more passage.

Near Motozintla, Cueva Puresa was surveyed to a length of 1 kilometer. Along the jungley edge of Cañon el Sumidero, several large old caves were found to be plugged. In the canyon itself, several caves 300 to 400 meters long were discovered, and other caves were believed to be submerged by the new reservoir.

At Oxchuc, 100 kilometers east of San Cristobal, many caves were found, but access problems with the local Indians inhibited exploration.

The expedition also visited Cueva de El Chorreadero, a popular through-trip stream cave. While jumping into one of the many plunge pools, Hans Hoff injured his foot.

source: Laurens Smets

GUANAJUATO

A group of cavers from Italy, Poland, and México explored various caves in the Mirasoles area of eastern Guanajuato in late 1984. The deepest cave discovered was Hoya del Poleo, a cave well decorated with helictites that reaches a depth of 375 meters. Also explored was Cueva Negra, 233 meters deep, and Cueva de Doña Cosimira, 140 meters deep and 50 meters long. In all, 57 new caves were explored on the expedition.

source: Carlos Lazcano

HIDALGO

A group of cavers returned to the Cardonal area in December 1984 to continue exploration projects begun in 1981 and 1982. Alan Cobb, Jon Cradit, Carmen Goyette, Joe Ivy, Linda Palit, Darrell Reese, Eric Short, and George Veni explored further in Grutas de Xofafi, into a complex breakdown maze beyond their previous survey, but still in passage that had been explored by tourists, judging from the string and spray paint. They postponed completing the survey due to various problems, but feel that they reached a maximum depth of about 55 meters.

At Grutas de Tolantongo, they found that a large travertine mass measuring 20 by 12 by 4 meters had fallen from the cliff face and blocked three quarters of the cave entrance. As a result, water and silt levels were higher in the cave, eliminating the meter-high waterfall that had hampered access to the cave's second chamber.

On the surface, a climb was made over a travertine wall that gave access to the presumed insurgence, previously accessible only by a long roundabout route. Jon Cradit and Eric Short climbed the travertine wall for 10 meters, then traversed a steep 8 meter slope, followed by a 40 meter rappell to La Gloria, where they could get a good look at the sumidero for the first time. A large volume of

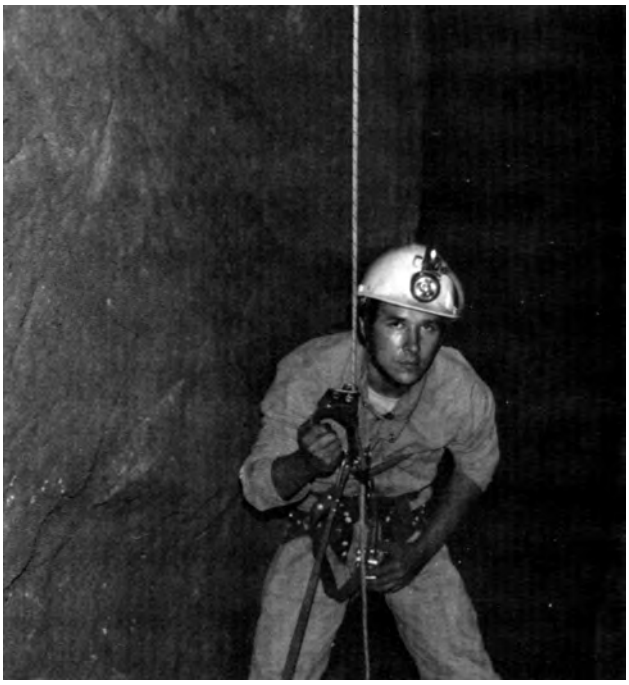
water tumbles down a shaft 8 meters in diameter, and many of the team members felt that descent would be suicidal.

source: George Veni

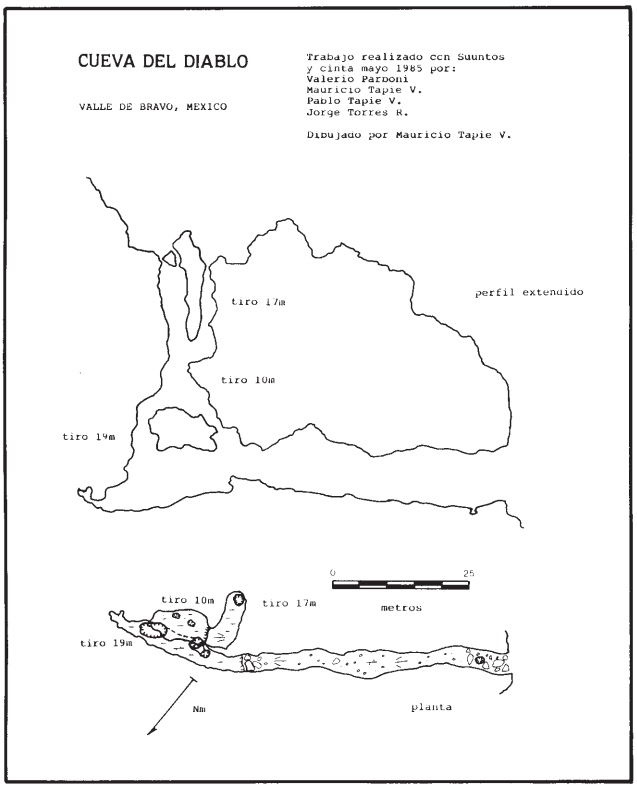
MEXICO

Cueva del Diablo, near Valle de Bravo in the western part of the state of México, was explored by Valerio Pargoni, Mauricio Tapie, and Jorge Torres on 11 May 1985. The cave is formed in a fracture that crosses a limestone rock outcrop called La Peña. It has two entrances, one vertical and the other horizontal. The vertical portion comprises three drops totalling 47 meters. The horizontal section is 80 meters long, and the total cave length is 127 meters.

source: Mauricio Tapie



Mauricio Tapie climbing one of the drops in Cueva del Diablo. (Jorge Torres)



MICHOACAN

A return trip to the promising Dos Aguas area was made in February 1985 by Lawrence Camp, John Crotts, Mike Fischesser, Gerald Laws, Andy McKinnon, Jack Osborne, Paul Pinson, Ray Rimmer, Tracey Stiller, and Holly Wieners. Near their camp 2 kilometers south of Puerto Hondo, they discovered a cave 120 meters deep that contains six drops. The first two drops can actually be downclimbed, and these are followed by drops of 7, 18, and 30 meters. The cave becomes much smaller at the sixth pitch, and descends through a spiraling canyon to a horizontal passage. At the bottom was a hole surrounded by loose mud and sand banks which they deemed unsafe to enter. No air movement could be detected. The cave contained only one 20-meter-long side passage, off of the

Cavers prepare to enter Cueva de Dos Aguas. The large entrance is in the background. (Ray Rimmer)

bottom of the third drop.

In the major stream in Cueva de Dos Aguas, the cavers turned around only a short way past the downstream limit of the previous year's exploration (see AN No. 14). Where there had been a sump, they were able to pass with 15 centimeters of airspace. But then the passage lowered to a body-sized crawl over stream gravel. This did not look safe or promising, so they did not push it. The depth at this point was estimated to be -130 meters, although no surveying has been done. A 30-meter-long infeeder in the downstream section of the cave was also explored. Another side passage on the left led to a 5-meter flowstone climb which could bypass the series of muddy drops from the entrance. Just before the first sump, a passage high on the right side was found to loop back into the room at the bottom of the second drop. This whole downstream section trends south, and may feed the water source for the town of Aguililla.

In the upstream section of Cueva de Dos Aguas, the Main Trunk was pushed past the upstream sump via Robbie's Bypass, but then got smaller. A right-hand infeeder into the Main Passage was explored for about 270 meters, and was reported to have no leads. A left-hand passage trended west over large rimstone for about 450 meters, where it terminated in 40-meter-high Mañana Dome. Although basically dry, it could be a major source of water in the wet season. Overall, Cueva de Dos Aguas may be 5 kilometers long. The group feels that the cave is fully explored, and that mapping would be a worthy project, though one that would require a fast and efficient crew to lessen cold water problems. After five hours in wetsuits, they found they were beginning to have trouble keeping warm.

Near Cueva de Dos Aguas they checked five sinks and small caves, but nothing promising was found. Then they checked what they called the Valley of the Caves, situated 3 kilometers northwest of Paso Malo. Two large entrances were found that take a lot of water in the rainy season. One of these ended in a logjam after 70 meters. The other, Cueva del Río, was explored for about 1600 meters to a sump, with the only possible lead being high up on one wall. The locals say the water comes out in the small village of Nacimiento, slightly lower and 6 kilometers to the south. Flood debris can be seen 20 meters up the sides of the valley adjacent to the entrance, indicating that the water backs up trying to drain into the cave. The group intends to continue checking this area in 1986.

source: Mike Fischesser

In April 1985, Carlos Lazcano, Mauricio Tapie, Louis Torelli, and Jorge Torres explored two caves and a pit in the municipio de Zitácuaro. They had heard rumors of a pit 90 meters deep, which actually turned out to be 35 meters deep and 43 meters long. Hoyo el Pequeño is formed in basalt along a fracture oriented at 310 degrees. The entrance is a 3-meter pit, followed by various small drops.

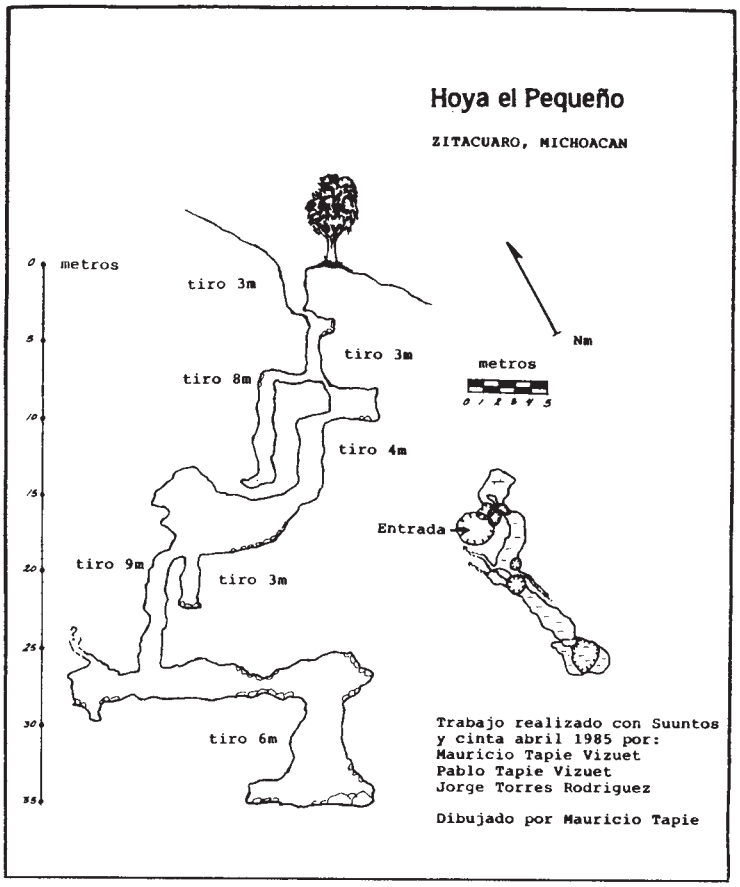
Near Turundeo, the two Grutas del Turundeo were explored. No. 1 is a resumidero 240 meters long and 10 meters deep, leading down to a small sump. No. 2 is a relict resumidero with two entrances, a crawl and a 3-meter pit. It is 60 meters long and 6 meters deep.

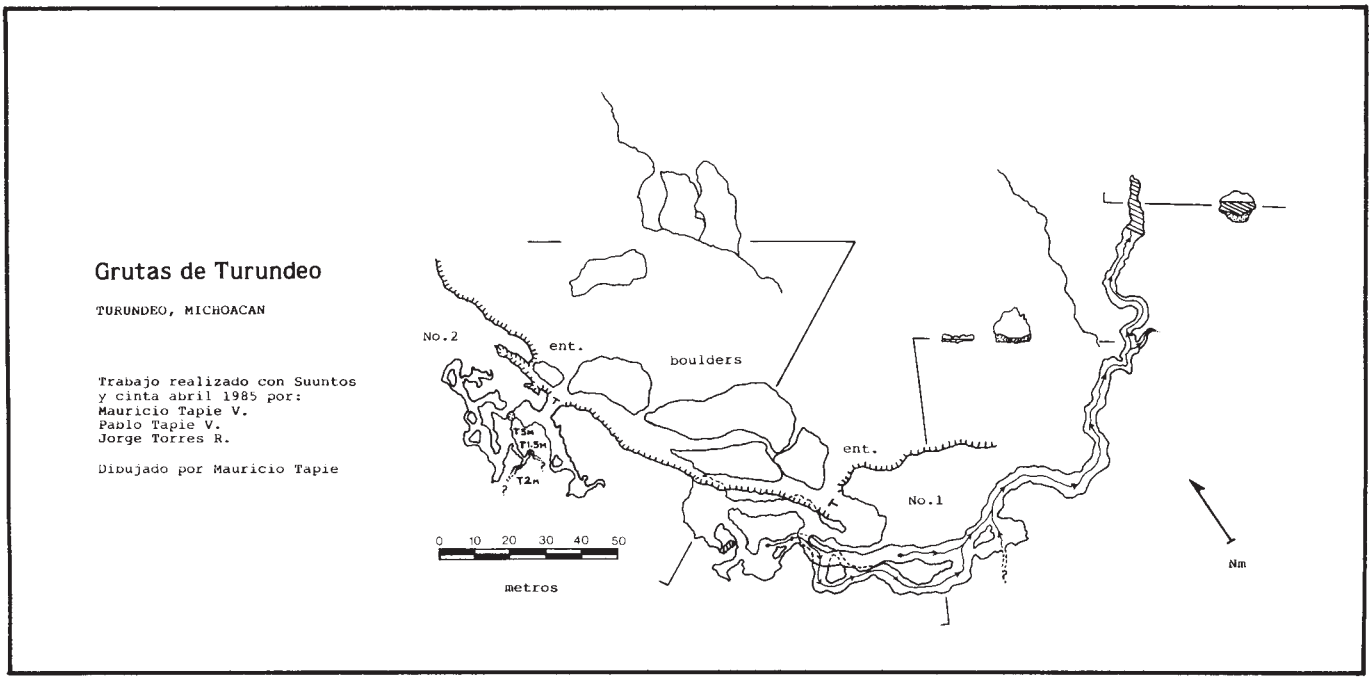
source: Mauricio Tapie

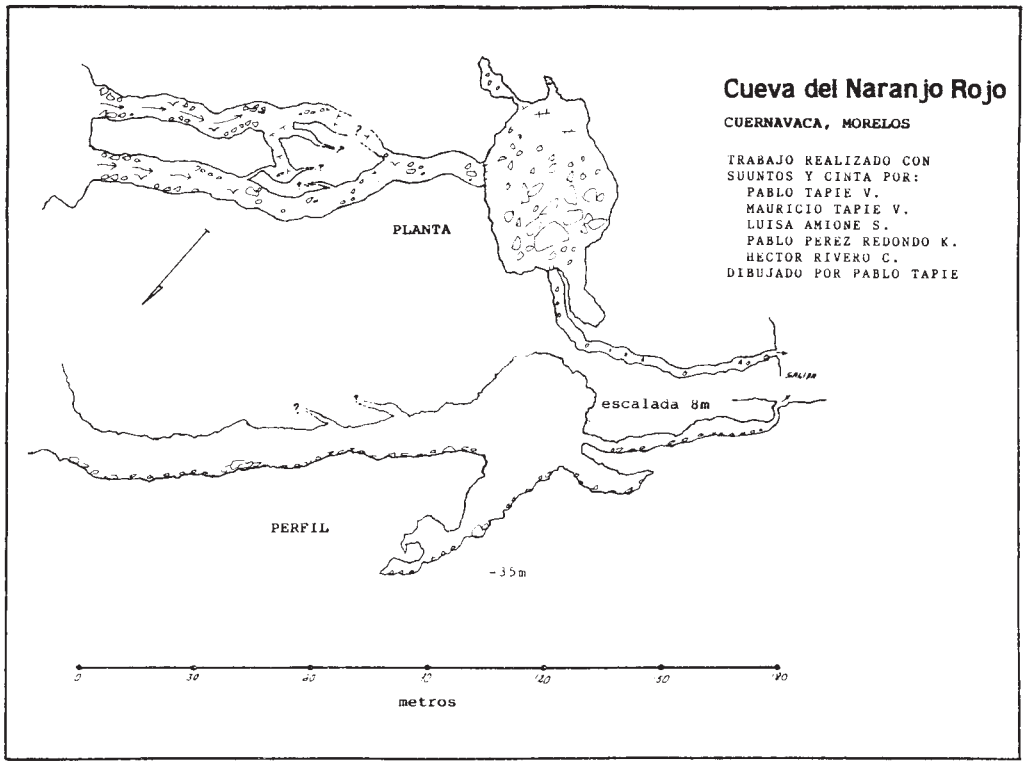
MORELOS

On 25 November 1984, Luisa Amione, Pablo Pérez-Redondo, Hector Rivero, Mauricio Tapie, and Pablo Tapie investigated a volcanic area near Naranjo Rojo. At kilometer 6.5 on the Cuernavaca-Tepoztlán highway they located Cueva del Naranjo Rojo. Two entrances side by side soon connected through an untraversed lava crawl. The main passage in the right-hand entrance goes 90 meters to a 14-meter drop. A good natural tie-off got the cavers down this and into a large room. On the far side a climb up 8 meters led to a 50-meter-long tunnel to a small third entrance, 200 meters from the other two.

source: Pablo Tapie







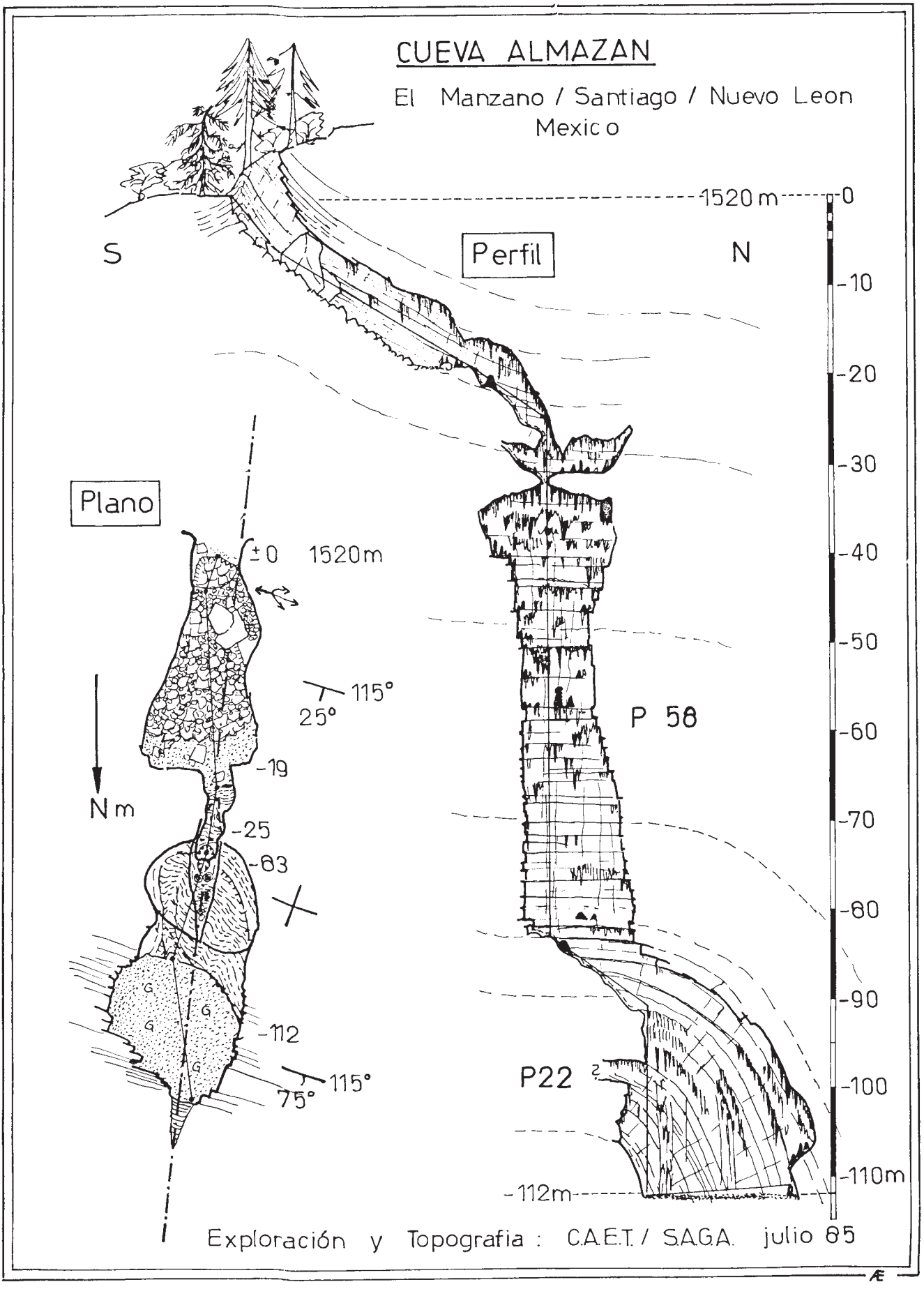
NUEVO LEON

Two German cavers and geology students of the Speleologische Arbeitsgruppe Aachen (SAGA) and members of the Club Alpino Espeleologico Tres de Monterrey (CAET) have been exploring caves in the vicinity of Laguna de Sánchez, 40 kilometers south of Monterrey. Near El Manzano, 5 kilometers west of Cola de Caballo, several mostly vertical caves were explored at the top of the San Lucas Anticline. The deepest was Cueva Almazan, which the locals said was named for General Almazan, who reportedly hid with his men in the cave entrance during the revolution. The cave seemed to be unexplored, as no footprints were seen in the mud at the bottom, but it is probably the same as Sótano del Anticlino explored by AMCS members in 1971 and described in AMCS Newsletter vol. III no. 5.

The 112-meter-deep pit is developed in the upper part of the Aurora limestone. The contact with the overlying Cuesta del Cura formation lies above the entrance, where a small anticline can be seen. The morphology of the cave is closely related to the dip of the limestone beds and an almost north-south trending fault plane. The pit is well decorated, and many bats flew out during the exploration.

Ten kilometers southeast of Laguna de Sánchez is a mesa called La Camotera. It is made up of well-cemented Cupido and Aurora limestone breakdown deposits that fill up an older, 200-meter-deep valley in the center of the El Chorro Anticline. This feature extends from La Camotera in the northwest to Potrero Redondo and La Trinidad in the southeast. This rock seems to be as suitable for karstification as is more sound, massive limestone; karst features encountered include canyons, dolinas, and some caves. The latter include Cueva de la Tierra Rosa (AMCS Activities Newletter No. 14) and Sumidero de Cebolla (AN No. 11).

In August 1985, SAGA members Michael Denneborg and Andreas Emontspohl, and CAET members Claude Bachr, José Luis Martínez, and Ruben Loaiza found a cave called Infierno de Camotera. It is a 55-meter shaft into a


CUEVA ALMAZAN
El Manzano / Santiago / Nuevo Leon
Mexico
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-83
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-90
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P22
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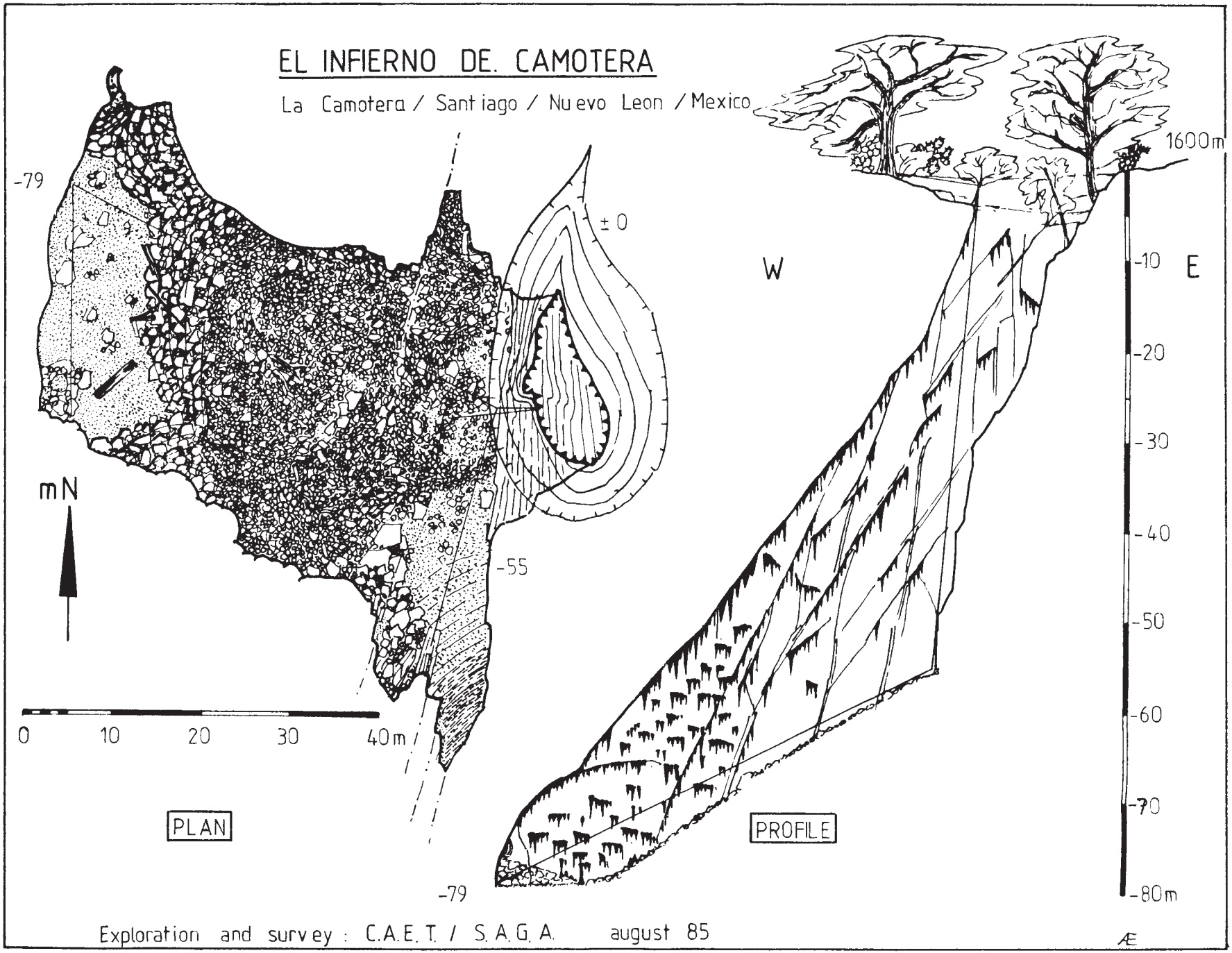
Exploración y Topografia : C.A.E.T. / S.A.G.A. julio 85


EL INFIERNO DE. CAMOTERA
La Camotera / Santiago / Nuevo Leon / Mexico
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20
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-20
-30
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-50
-60
-70
-80m
PROFILE
Exploration and survey : C.A.E.T. / S.A.G.A. august 85

large room with a rocky, sloping floor. Guano is present, as are bats on the ceiling. Infierno is formed along some sort of fault, and the breakdown deposits do not seem to be very old.

source: Michael Denneborg,
Andreas Emonts-pohl

OAXACA

In late January 1985, Blane Colton, Ernie Garza, Laszlo Kubinyi, and Karlin Meyers conducted a reconnaissance of the Suchitunaco plateau, a section of the Sierra Mazateca east of Huautla. They were able to scout the routes up into the area and found a number of caves. They found their way to the edge of an enormous sinkhole that had captured the interest of cavers since 1969. But Cerro Rabón and Cerro Coatzopan, forested karst areas above 2000 meters, remain unchecked.

In spite of warnings about unfriendly locals, they found the Mazatec Indians of the area to be quite hospitable. Access was gained via a newly built trail out of Jalapa de Díaz, which ascends 1400 meters in 5 kilometers. Dozens of pits and caves were noted, and several were briefly investigated. One of these, Cueva de San Martín, was downclimbed 40 meters to the edge of a 2.5 second pit. Travel off of existing trails proved to be difficult at best, but trails were often found in just the right places.

The depth potential for caves on this high plateau is substantial. It was learned that some very large springs emerge below the surface of the Presa Miguel Alemán. The most promising access to the area is via a trail from San José Tenango. Unfortunately, the group was denied permission to go in that way due to a recent sensitive archeological find in a cave nearby. While negotiations for official permission are underway, it is currently off limits to outsiders. The cavers involved would like to ask others be patient and not jeopardize future access by making trips to the area until formal permission can be arranged with the state Institute of Anthropology and the Presidente of Tenango.

source: Blane Colton

In April 1985, a group of six Australian cavers investigated a new karst area around Maria Luisa, on the plateau north of Huautla. They began to find caves immediately. Sótano Oso Muento was pushed to a length of 1.13 kilometers and a depth of 242 meters. A very spectacular 80-meter entrance shaft was followed by passages of dry, loose breakdown. Sótano de los Ladrones was explored down a 170-meter entrance pitch to a narrow blowing rift. The cave name came from an incident where some caving gear was stolen.

Some of the group walked over a ridge to the giant closed valley of Zongolica. The locals proudly showed them their caves, and in the night the missing equipment mysteriously reappeared on a rock outcrop. One of the better looking entrances in that area was a small stream-sink named Nita Xonga. After several days of exploration an apparent bottom was reached at about -340 meters. However, during the derigging a side lead was discovered at about the 300-meter level which led to a new streamway. Instead of reconnecting into the boulder pile at the bottom of the cave as expected, it led to a 50 meter pit. Several streams entered at the bottom, and then a larger one further along. After descending a short drop, the cavers found themselves looking down another longer drop at about -450 meters, and with not enough rope to do it. Rocks dropped for several seconds, and bounced for a few more. Out of time, the Australians made plans to return in November 1985.

sources: David Martin, Alan Warild
Descent No. 66, October 1985

The Yucuyacua mountain range in far western Oaxaca was first investigated in 1982 by Steve Knutson, Bill Liebman, and Randy Spahl. After a long

drive on dirt roads, they reached the Mixtec town of Itundujia, situated next to a large dolina with sinks and pits on the bottom. In the area nearby, they found karst towers and more large sinks, mostly filled by erosion. After several days of investigation they located a promising entrance near Buena Vista, which they pushed down two short rope drops and some climbs to a swim, with another drop on the far side. They could not detect any airflow, however.

In 1983 a return trip was made to the area. This time the group consisted of Warren Anderson, Bill Bockstiegel, Steve Knutson, Dick LaForge, and Dave Walker. After establishing camp near Buena Vista, Bill and Warren were shown a second cave near the first one. It descended rapidly down a fault, and had airflow. The crew explored down through several constrictions and short drops to a depth of about 100 meters, where they stopped at the top of a 15 meter drop. Illness among the crew and some problems with the locals prompted them to leave the area at that time. When Knutson, Jim Pisarowicz, and Mary Standifer returned in 1984, they were told they could not go into the area.

source: Steve Knutson
NSS News, November 1985

PUEBLA

Since 1980, Belgian cavers of the Groupe Speleo Alpine Belge (GSAB) have made four trips to México. These 2-month trips of six to eight cavers have in the past been moderately successful. Several kilometers of passages and depths up to 300 meters have been pioneered, but no real spectacular finds were made.

The fifth expedition in March and April of 1985 had much more success, resulting in the discovery of 35 kilometers of passages in various caves. Now accustomed to México and its karst, the group chose a new area close to Zoquitlán and Alcomunga, near the boundary of the states of Puebla and Oaxaca. This area had been checked toward the end of the 1983 GSAB expedition and seemed very promising.

The sixteen members of the expedition divided into two groups. Ten cavers concentrated on the area around Alcomunga, Ocotempa, and Huitzmoloc, between 1600 and 2200 meters elevation. In the lapiaz and dolinas of this area they hoped to find the high entrances to a presumed system with a depth potential of up to 2000 meters. The other group prospected the resurgence zone at Coyolapa and Atzempa, at altitudes of 200 to 350 meters.

On the high plateau, more than 9 kilometers were mapped in various caves. At Huitzmoloc (elevation 1650 meters), a cave called Aztotempa was explored for 4 kilometers, to a depth of 700 meters. It contained a room 350 meters long, 100 to 150 meters wide, and 40 to 60 meters high. Also explored in this area was Montitla, one kilometer long.

Near Ocotempa, at 1760 meters elevation, a lot of shafts were found that were 100 to 150 meters deep. The deepest was Pozo Verde, a 380-meter rope drop with a large but short gallery at the bottom. A meander through a very compact limestone then led to the deepest point at -400 meters. The shallower pits included OC 8, a 160-meter pit that reaches a total depth of 260 meters, OC 4, a 160-meter pit, HU 2, a 100-meter pit, and Sótano de Aztotempa, a 100 meter pit.

Higher up at San Miguel (elevation 1850 meters), El Mirador was explored to a length of 1070 meters and a depth of 150 meters. At Alcomunga (2100 meters elevation), a cave named AL 7 was explored to a length of 850 meters and a depth of 90 meters.

Down at the resurgence level, the major discovery was Coyolatl, at an elevation of 350 meters. This is a huge river cave 19 kilometers long, with a river that flows 15 cubic meters per second in the dry season through wide trunk passages 50 meters high. The cave has a vertical extent of 200 meters.

At Oztopulco (elevation 330 meters), first investigated in 1982, 5

kilometers of galleries are now known in three large resurgences. These are Xantilco (1 kilometer long), Tamazcalco (3 kilometers), and Resumidero del Río Topitza.

So now with such good potential to return to, there will certainly be a sixth Belgian expedition to México.

source: Richard Grebeude
Georges Feller, Speleo Flash No. 147

Just to the south of the area explored by the Belgians, an Australian expedition in February 1985 discovered numerous pits around the mountain Xincinteptl, above the village of Coyomeapan. During a pre-expedition recon, Steve Bunton and Alan Warild had found three pits about 100 meters deep near the village of Ixtlahuac, and had begun exploration of one of them. With the arrival of the main group, two pits were quickly bottomed, Sotanito de Ixtlahuac and Sótano del Malvavisco. Both contained a series of vertical pitches ending at about -150 meters. Sótano del Serrucho began with a spectacular 77-meter free pitch. A steep talus slope led to a second drop, below which they were stopped by a flowstone blockage.

Two weeks of further lead-checking around Ixtlahuac produced numerous pits and entrances, but nothing extensive. Cueva de la Telaraña was the only true "cave" found, and it was only 30 meters long and 17 meters deep. The pits were more impressive. Sótano de la Vampiresa was bottomed at 106 meters, and Hoyo del Conejón at 158 meters. The latter began with a 124-meter entrance shaft. Attempts to follow airflow by climbing up in some of these pits produced no results. Near the summit of Xincinteptl, at over 3000 meters elevation, a small blind shaft was found.

source: David Martin, Alan Warild
Descent No. 66, October 1985

Cueva Escalera, near Cuetzalan, was explored and mapped by Don DeLucia, Lisa DeLucia, John Ganter, David McClurg, and Gary Mele on 30 December 1984. This cave was explored in 1972 or 1973 by Nevin Davis, who described it in AMCS Newsletter vol. IV no. 5-6. The entrance is in a clump of brush 10 meters southeast of the Jonotla-Cuetzalan road.

A slippery fissure 1 meter wide drops for 12 meters to a wide, meandering trunk passage. The remains of a ladder (escalera) are on the floor. The cave extends under the road to the southwest, then terminates in shaly breakdown. The trunk continues to the northeast, where weathering has formed calcite sand on the floor, reminiscent of sugar coating.

Fifty meters from the entrance, they dug in a hole along the east wall. The 6-meter pit would be difficult to descend due to the loose sand. Past the pit, the main passage continues, with the cave stream largely hidden beneath breakdown and calcite. The passage terminates in breakdown, and the stream issues from a small passage on the left side. Cueva Escalera is 362 meters long and 37 meters deep.

source: John Ganter
Nittany Grotto News, vol. XXXII no. 4 (map)

QUERETARO

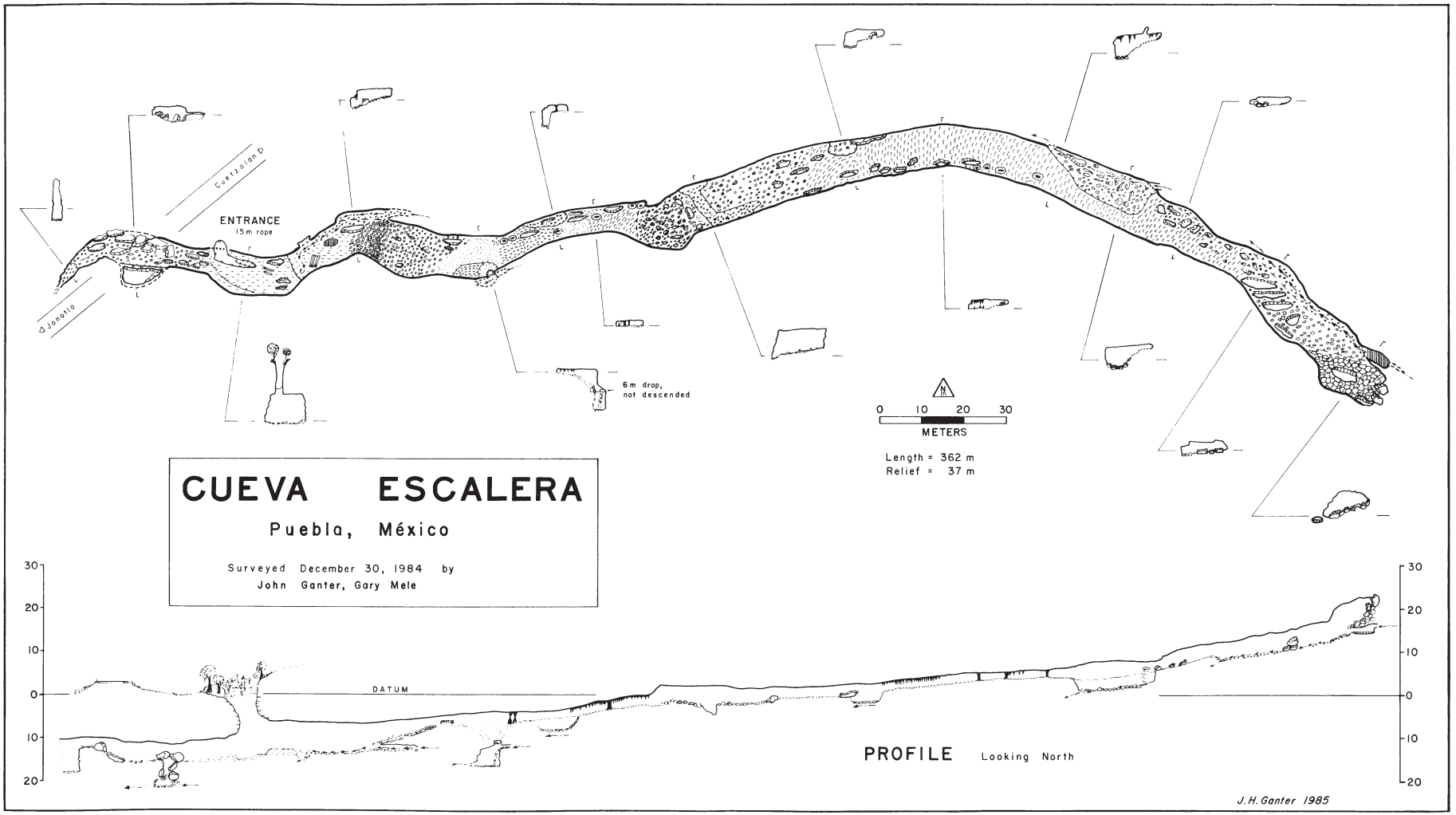
A group of cavers from México, D.F., led by Eusebio Hernández, explored eight pits at Tonatico, near Pinal de Amoles, in December 1983. The deepest of these was Sótano del Puerto de San Pedro, with a total depth of 177 meters. The first drop is 36 meters deep, and the second is 102 meters.

source: Carlos Lazcano

SAN LUIS POTOSI

Another obscure pit has been discovered close to Sótano del Arroyo (see AN No. 14). On 3 February 1985, Marcus Buck and Mary Standifer noticed a small entrance below a bedrock ledge along the trail down to Arroyo. Sótano Obscuro del Arroyo turned out to have two drops of 11 and 25 meters, after which the cave ended.

source: Marcus Buck


ENTRANCE
15m rope
Cuetzalan
Jonotla
6m drop,
not descended
N
0 10 20 30
METERS
Length = 362 m
Relief = 37 m
CUEVA ESCALERA
Puebla, México
Surveyed December 30, 1984 by
John Ganter, Gary Mele
30
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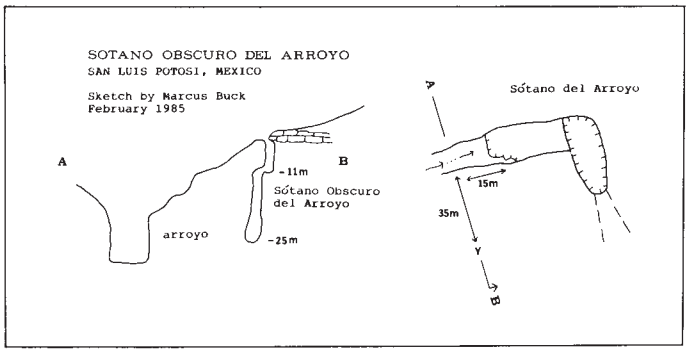
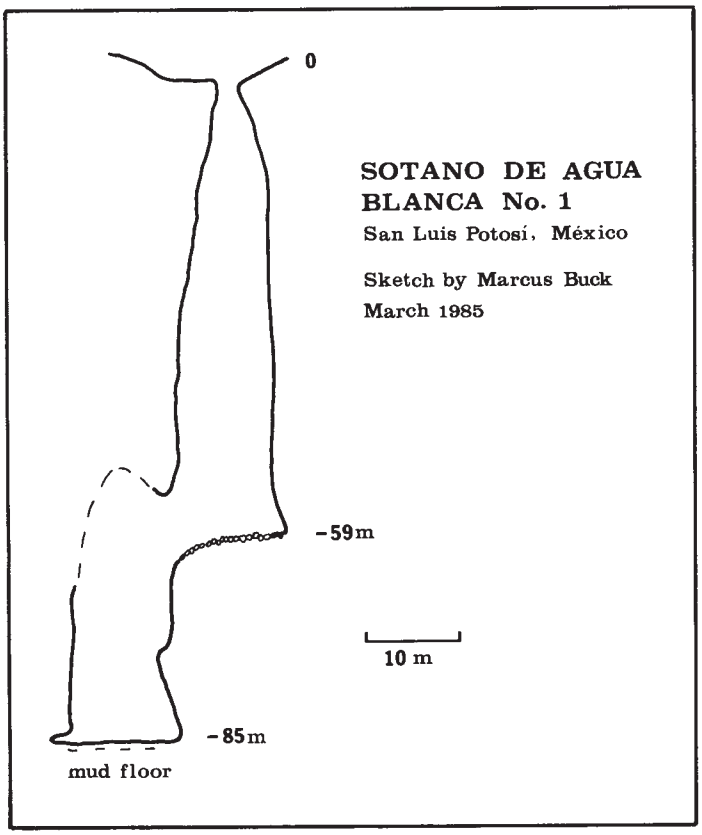
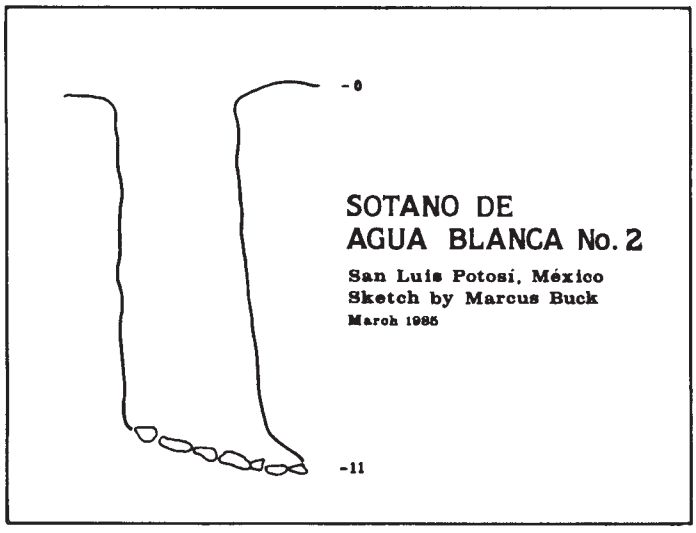
DATUM
PROFILE Looking North
J.H. Ganter 1985







In March 1985, Marcus Buck and Brian Smith explored two pits 500 meters northeast of Agua Blanca, about 2 kilometers southeast of Valle de los Fantasmos. Sótano de Agua Blanca No. 1 has an initial free drop of 59 meters, and ends in a flat mud floor at 85 meters depth. Sótano de Agua Blanca No. 2 is a blind pit 11 meters deep. Also explored was Sotanito de Agua Blanca No. 1, 30 meters deep.

source: Marcus Buck

VERACRUZ

Lori Robertson and Steve Robertson spent several days caving in the area around Zongolica in December 1984. They investigated rumors of large caves near Coetzala in the Zongolica range; they turned out to be little more than large shelter caves. These were Cueva Donde Brota el Agua and Cueva de las Pinturas de Coetzala. The latter has six pictographs of fine quality, which, amazingly, were situated 30 to 40 meters up a slick, slightly overhung vertical wall.

They had intended to check out the resurgence of the Río Tonto, but decided against it when they learned that land feuds were in progress and that people in a nearby village slept in the hills to avoid roving bands of armed campesinos. At the sumidero El Popoca, their efforts to collect cave fish were thwarted by high water from heavy rain the night before. The normal flow of one cubic meter per second was nearly doubled, making the 60-meter entrance pitch truly awesome.

source: Steve Robertson

Long Caves of México

compiled by Peter S. Sprouse

1.	Sistema Purificación	Tamaulipas	55,078
2.	Sistema Huautla	Oaxaca	33,789
3.	Sistema Cuetzalan	Puebla	22,432
4.	Coyalatl	Puebla	19,000
5.	Nita Nanta	Oaxaca	11,655
6.	Sumidero Santa Elena	Puebla	7884
7.	Cueva de la Peña Colorada	Oaxaca	7793
8.	Atepolihuit de San Miguel	Puebla	7700
9.	Sótano del Arroyo	San Luis Potosí	7200
10.	Cueva del Tecolote	Tamaulipas	7015
11.	Actún de Kaua	Yucatán	6700
12.	Sumidero de Jonotla	Puebla	6381
13.	Sótano de Las Calenturas	Tamaulipas	6032
14.	Gruta del Río Chontalcoatlán	Guerrero	5827
15.	Gruta del Río San Jerónimo	Guerrero	5600
16.	Grutas de Juxtlahuaca	Guerrero	5098
17.	Veshtucoc	Chiapas	4900
18.	Cueva del Nacimiento del Río San Antonio	Oaxaca	4570
19.	Sótano de la Tinaja	San Luis Potosí	4502
20.	Sótano de Japonés	San Luis Potosí	4500
21.	Sistema San Andres	Puebla	4471
22.	Sótano del Río Iglesia	Oaxaca	4206
23.	Sistema Zoquiapan	Puebla	4107
24.	Sima del Borrego	Guerrero	4087
25.	Aztotempa	Puebla	4000
26.	Sumidero San Bernardo	Puebla	3931
27.	Sótano de Agua de Carrizo	Oaxaca	3748
28.	Nita Nashi	Oaxaca	3524
29.	Cueva del Río Jalpan	Querétaro	3440
30.	Actún Xpukil	Yucatán	3353
31.	Cueva de la Laguna Verde	Oaxaca	3350
32.	Sumidero Yochib	Chiapas	3316
33.	Cueva de El Chorreadero	Chiapas	3280
34.	Resumidero la Joya	Guerrero	3245
35.	Atepolihuit de Nauzontla	Puebla	3066
36.	Sótano de Tlamaya	San Luis Potosí	3057
37.	Sistema de Montecillos	San Luis Potosí	3022
38.	Resumidero de Toxin	Jalisco	3005
39.	Sótano de Huitzmolotitla	San Luis Potosí	3002
40.	Sumidero de Atliliakan	Guerrero	3000
41.	Sótano del Río Coyomeapan	Puebla	3000
42.	Tamazcalco	Puebla	3000
43.	Sótano del Tigre	San Luis Potosí	3000
44.	Boca del Río Apetlanca	Guerrero	2750
45.	Cueva Ayockal	Puebla	2702
46.	Actún Loltun	Yucatán	2682
47.	Sistema Santa Lucia	Puebla	2500
48.	Cueva de Juan Sanchez	Oaxaca-Veracruz	2493
49.	Sima de la Cruz Verde	Puebla	2301
50.	Cueva de la Llorona	Tamaulipas	2256

Deep Caves of México

compiled by Peter S. Sprouse

1.	Sistema Huautla	Oaxaca	1252
2.	Nita Nanta	Oaxaca	1080
3.	Sistema Purificación	Tamaulipas	895
4.	Sótano de Agua de Carrizo	Oaxaca	836
5.	Sótano de Trinidad	San Luis Potosí	834
6.	Aztotempa	Puebla	700
7.	Sótano de Tilaco	Querétaro	649
8.	Nita Nashi	Oaxaca	641
9.	Cueva de Diamante	Tamaulipas	621
10.	Nita He	Oaxaca	594
11.	Sistema Cuetzalan	Puebla	587
12.	Sótano de las Coyotas	Guanajuato	581
13.	Sótano del Río Iglesia	Oaxaca	531
14.	Sótano de Nogal	Querétaro	529
15.	Sótano de Ahuihuitzcapa	Veracruz	515
16.	Sótano de las Golondrinas	San Luis Potosí	512
17.	Hoya de las Conchas	Querétaro	508
18.	Sótano del Buque	Querétaro	506
19.	Hoya de las Guaguas	San Luis Potosí	478
20.	Cueva de San Agustín	Oaxaca	461
21.	Sótano del Barro	Querétaro	455
22.	Hoyo de San Miguel	Guerrero	455
23.	Sótano Itamo	Veracruz	454
24.	Nita Xonga	Oaxaca	450
25.	Cueva de La Peña	San Luis Potosí	448
26.	Sótano de Tlamaya	San Luis Potosí	447
27.	Pozo Verde	Puebla	400
28.	Sumidero Santa Elena	Puebla	400
29.	Atepolihuit de San Miguel	Puebla	399
30.	Cueva de la Llorona	Tamaulipas	398
31.	Sótano de la Joya de Salas	Tamaulipas	376
32.	Hoya del Poleo	Guanajuato	375
33.	Sótano Tomasa Kiahua	Veracruz	374
34.	Sótano de la Virgen	Querétaro	352
35.	Sótano del Perro Vivo	Hidalgo	350
36.	Cueva de El Chorreadero	Chiapas	345
37.	Cueva de Xocotlat	Puebla	339
38.	Sótano del Río Coyomeapan	Puebla	337
39.	Grutas de San Cristobal	Chiapas	330
40.	Sótano de Los Hernandez	Querétaro	330
41.	Cueva de Santa Cruz	Oaxaca	327
42.	Sumidero del Río Xocotlat	Puebla	323
43.	Sótano de Seis Segundos	Oaxaca	323
44.	Sotanito de Ahuacatlán	Querétaro	320
45.	Hoya de Zimapan	San Luis Potosí	320
46.	Sumidero de Atikpak	Veracruz	319
47.	Nita Ntau - Nita Nido	Oaxaca	310
48.	Sótano de Jabalí	Querétaro	308
49.	Sistema Zoquiapan	Puebla	297
50.	Sótano del Burro	Querétaro	292

XILITLA PROJECT REPORT

Compiled by Terri Sprouse

The Xilitla area in the state of San Luis Potosí has always been one of the prime caving areas in México. For a number of years AMCS cavers have been gathering information for an AMCS Bulletin on the area.

A trip to the Xilitla area sounded like an excellent way to spend the Christmas holidays of 1984. The unfinished map of Sótano de Tlamaya was a good enough reason to organize an expedition to the area. Recruiting cavers for the project was no problem. Over 20 cavers from various parts of the continent -- Canada to Texas, California to Pennsylvania -- participated over the course of the week-long project.

The main objective was to complete the survey of Sótano de Tlamaya down the final drop to the sump, and to map the upstream infeeder that leads into the Big Room. After sorting and labeling ropes, two groups entered the cave to rig the drops down to the Big Room. Rigging via the Upper En-

trance was chosen, because that route consists of several relatively short drops, whereas the first pitch into the Lower Entrance is almost 84 meters. It is much faster for large groups to move through a series of short drops, rather than pile up at the bottom of a long drop.

RIGGING TO THE BIG ROOM

The first rig team of Marcus Buck, John Ganter, Louise Hose, and Brad Wilson entered Tlamaya and accomplished their goal of rigging to the 45-meter drop. A couple of hours after the first crew entered, the second team of Dave Bunnell, Bill Farr, Gary Mele, and Carol Vesely left for the cave. When they reached the ninth drop the fun began. They had inadvertantly free-climbed the previous handline drop. So now the ropes were out of sequence, but they did not discover the error until after a complicated feat of rigging and re-rigging.

They found themselves at the top of what appeared to be a 20-meter drop, and the rope that they thought was numbered and marked for this particular drop was only 20 meters long. The tie-off alone looked like it would use up almost 10 meters. They went ahead and tied the rope off anyway, so that they could better gauge the situation. Dave peered over the lip and thought he could see the rope just above the floor. Scavenging a piece of webbing, they retied the rope. This time Dave tied a flashlight to the end and declared he thought it reached the bottom. He must have felt confident that it did, because he rigged in and descended without any ascending gear on. Before long, though, he was calling back up to the others that he was at the end of the rope and still a good 5 meters off the bottom.

His companions above felt they could safely tie another rope to the rope Dave was dangling from and lower him down. He agreed to let them have a go at it. With considerable effort, Bill, Carol, and Gary managed to lift Dave up a few inches. While Bill and Gary held Dave in place, Carol added a longer rope and tied it off, and they lowered Dave down. By now they realized why the rope had been too short to begin with, and they corrected the problem and proceeded on down to the Big Room.

They romped around in the Big Room for a while, had lunch, and took a short excursion into the upstream feeder. They found it to be nice walking passage, not too muddy, with lots of pretty sculpting in the walls.

SURVEY TO THE BOTTOM

The next day two teams formed to go to the bottom of the cave. Paul Fambro, Laurent Ouellet, Susie Raines, and Terry Raines completed the rigging from the Big Room on down to the bottom. John Ganter, Louise Hose, Peter Sprouse, and Luc Trepanier followed the rig team in, taking photos along the way. At the bottom of Fossil Pit, Peter climbed up to an intermediate level where he saw four leads. They continued on to the bottom of the Pinnacle Drop, where the survey began.

Following the Pinnacle Drop are a couple of short climbdown pitches, and then the cave continues for several hundred meters as a nearly level stream passage with many pools . The passage gradually widens, with major ledges above the stream on either side. Often it is not possible to see the upper walls, and there may well be incoming passages in this area. A final 5-meter climbdown can be descended on the right side; then the passage turns left and becomes very muddy. An incised stream channel winds between high mudbanks, and the high ceiling is nearly beyond sight. Suddenly the passage becomes low and narrow, and the cave ends in a low room 3 meters wide. The flowing stream disappears in mud under the

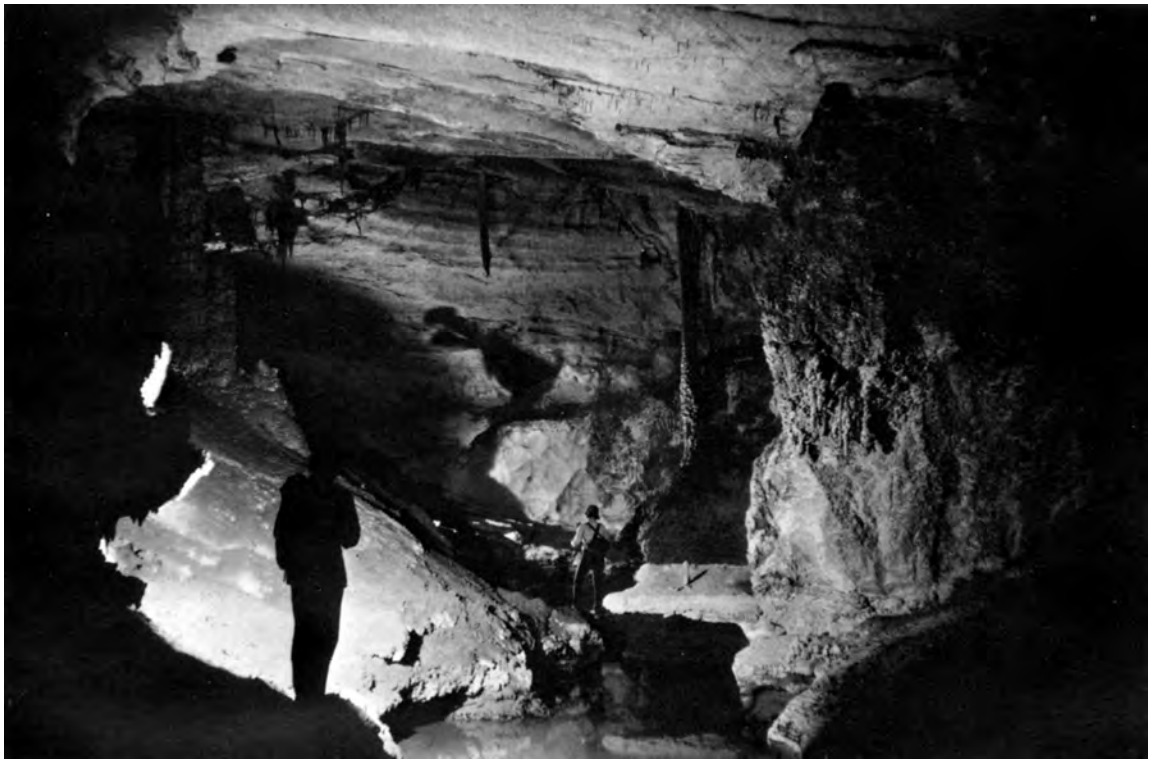
Opposite: Bill Farr at Junction Pit in Sótano de Tlamaya. (Dave Bunnell)

The Lower Streamway in Sótano de Tlamaya. (Peter Sprouse)

wall ahead. In wet periods this section is inundated.

NEW LEAD

Two days later three teams entered the cave to wrap things up. David Dodge, Terri Sprouse, and Mary Standifer did some clean-up survey near the entrance. John, Paul, and Peter mapped the leads that Peter had noted at the top of Fossil Pit. This section, Amblypygid Canyon, led to another downstream section where they stopped at the top of a waterfall drop. Bill, Carol, Dave, and Gary headed down to the Big Room to survey the upstream lead. The mapping started out with nice ten and twenty meter shots through pleasant streamway, until they came to the "duck-under." There they donned their wetsuits and forged on with their grim survey through a bellycrawl in mud and water. They eventually came to a fair-sized room, the Tortilleria, 10 to 15 meters in diameter, with a couple of crawlways



Upstream Passage beyond Big Room in Sótano de Tlamaya. (Dave Bunnell)

leading off. A small lead is present up on one wall, and to the right off this room is a walking-sized passage, which soon lowers to a crawl. After 20 meters this passage forks.

To the right is a series of crawlways, one of which intersects a small flowing stream. Upstream this stream sumps, while downstream the passage continues small. Left at the passage fork, the crawlway continues then opens into a small room, the Ghoststone Room, marked by eroded flowstone and draperies.

At this point, there is a climb up to the right to a high canyon and a 6-meter-high flowstone climb. The canyon passage can be seen to continue above. The survey party all agreed that the climb was feasible, but they also felt that some protection was needed. They took a few photos and headed out.

On the way out, Carol experienced great pain in her feet, and ended up crawling most of the way, including the trail back to the truck. As it turned out, she was probably suffering from trench foot caused by wet feet inside boots that were too tight.

The next day Louise Hose, Laurent Ouellet, Marc Tremblay, and Luc Trepanier derigged the remainder of the cave from the Fossil Pit.

The map of Sótano de Tlamaya is still not complete. But at least all of the previously known and explored passages have been surveyed, with both plan and profile views drawn. Bill and Carol are seriously considering a return trip to survey the lead they left. Perhaps then the final map can be drafted. The current survey shows Tlamaya to be 447 meters deep and 3057 meters long.

SANTUARIO ADENTRO

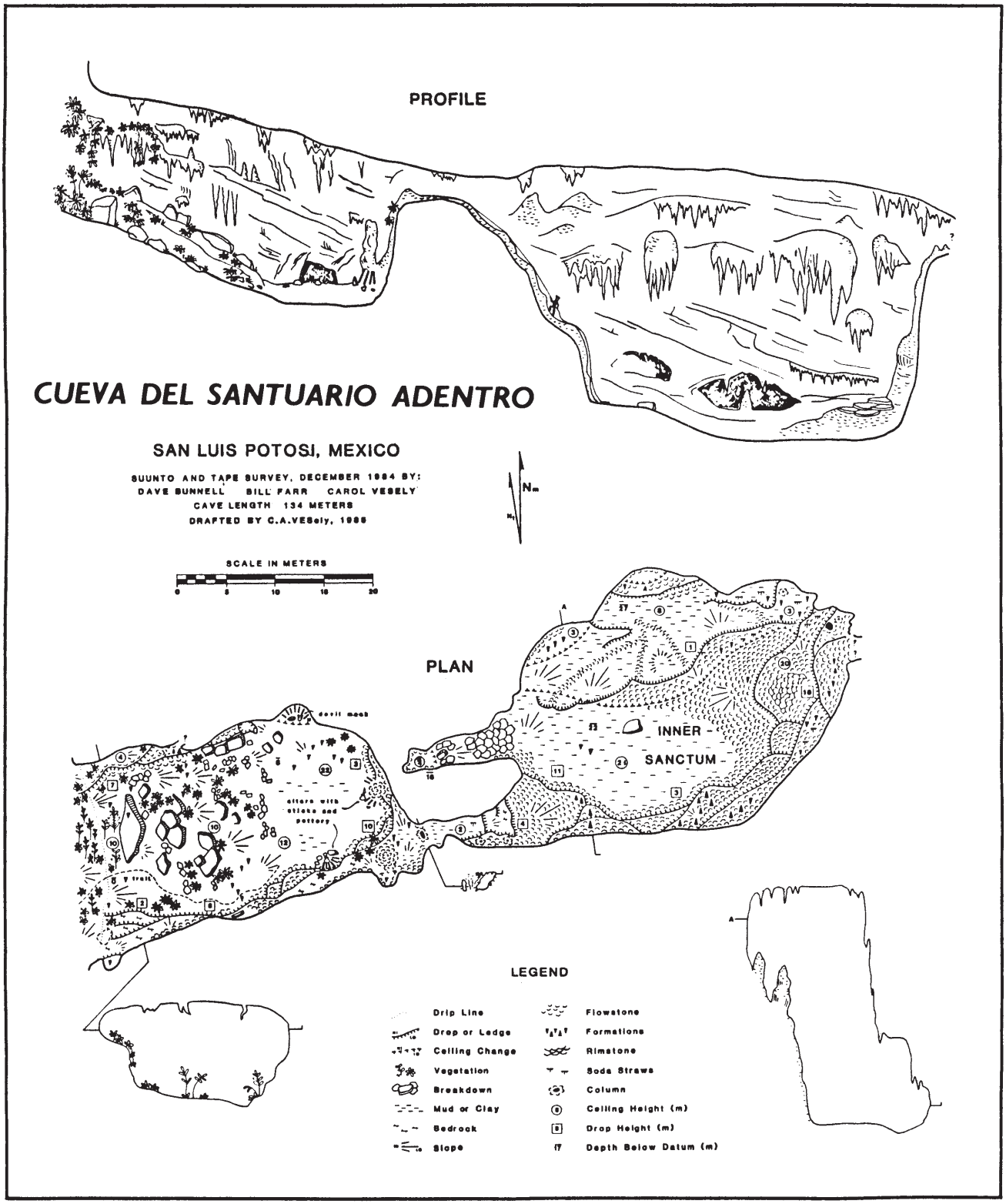
Between trips into Sótano de Tlamaya, several other caves in the area were discovered and explored. During the middle of the week Bill, Carol, and Dave headed off for Sótano de las Golondrinas, where they were to meet some friends who were bringing the rope. Their friends never showed up, but fortunately they had a contingency plan. Peter had given them a topo map and told them of a newly completed road to an area with good potential for caves.

They bounced and slid their way to the small village of Tancuim, where they immediately drew a crowd of locals. After chatting with the people and telling them that they were interested in seeing the local caves and sótanos, they were shown a pit about 50 meters from the truck. The entrance to Sótano de Tancuim No. 2 was about 6 to 8 meters across. This pit may be the same as Sótano de Tancuim No. 1, discovered in 1975 by Mike Schulte. Half the men and boys of the town watched as Bill descended about 25 meters and confirmed that it was dead bottom.

Next, two men said that they knew of a bigger pit about a half-hour walk away and offered to guide them. After agreeing on a price for their guide service, they all took off up the steep hill. They went through a few sinks and passed some intriguing karst outcrops with holes that looked like cave entrances. The guides said to ignore them; they were too small. Eventually they came to a gaping entrance in the side of a cliff.

Inside, the entrance floor sloped down steeply, but it certainly wasn't a pit as the guide had said. Instead, it was a large impressive room with breakdown and moss on the floor and old flowstone along the walls. The most interesting things in the room were some areas that the locals had been using as altars. One contained a few dozen long sticks and a broken pot. Another had more sticks, some fresh yellow flowers wrapped in leaves, a stack of rotting grade school books, and a devil's mask.

The guide pointed to a small hole in the flowstone high on the far wall. The pit was on the other side, through the hole. Bill climbed the wall and rigged a handline for Carol and Dave. At the top they found themselves in a large chamber with a great echo. The

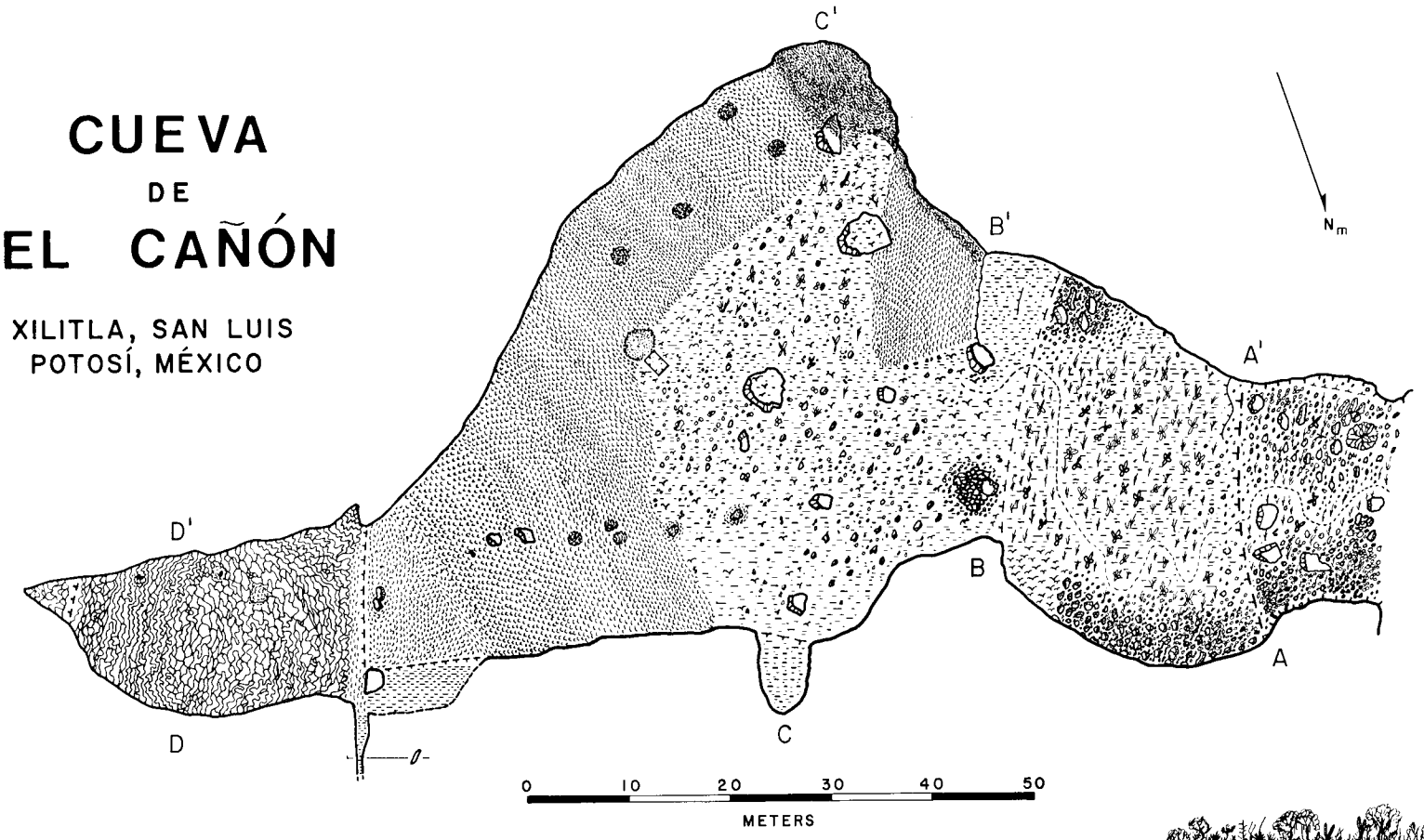


floor sloped off into a pit. They decided to return the next day with a rope and survey gear.

The pit turned out to be about 25 meters deep, against a beautiful flowstone wall most of the way. The room at the bottom was impressive in size, with some nice formations, giant rimstone dams, cave pearls, and very attractive flowstone areas. There is

CUEVA
DE
EL CAÑÓN

XILITLA, SAN LUIS
POTOSÍ, MÉXICO



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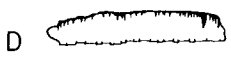
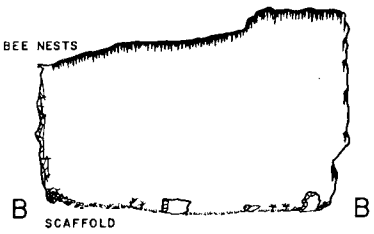
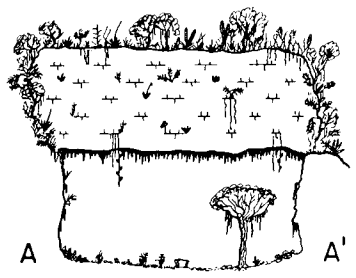
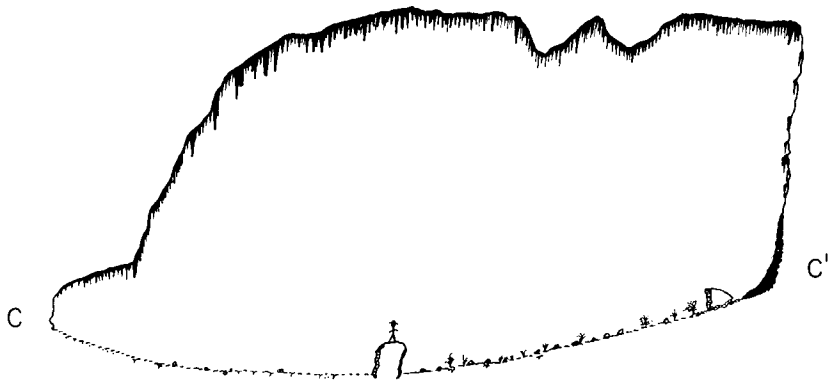
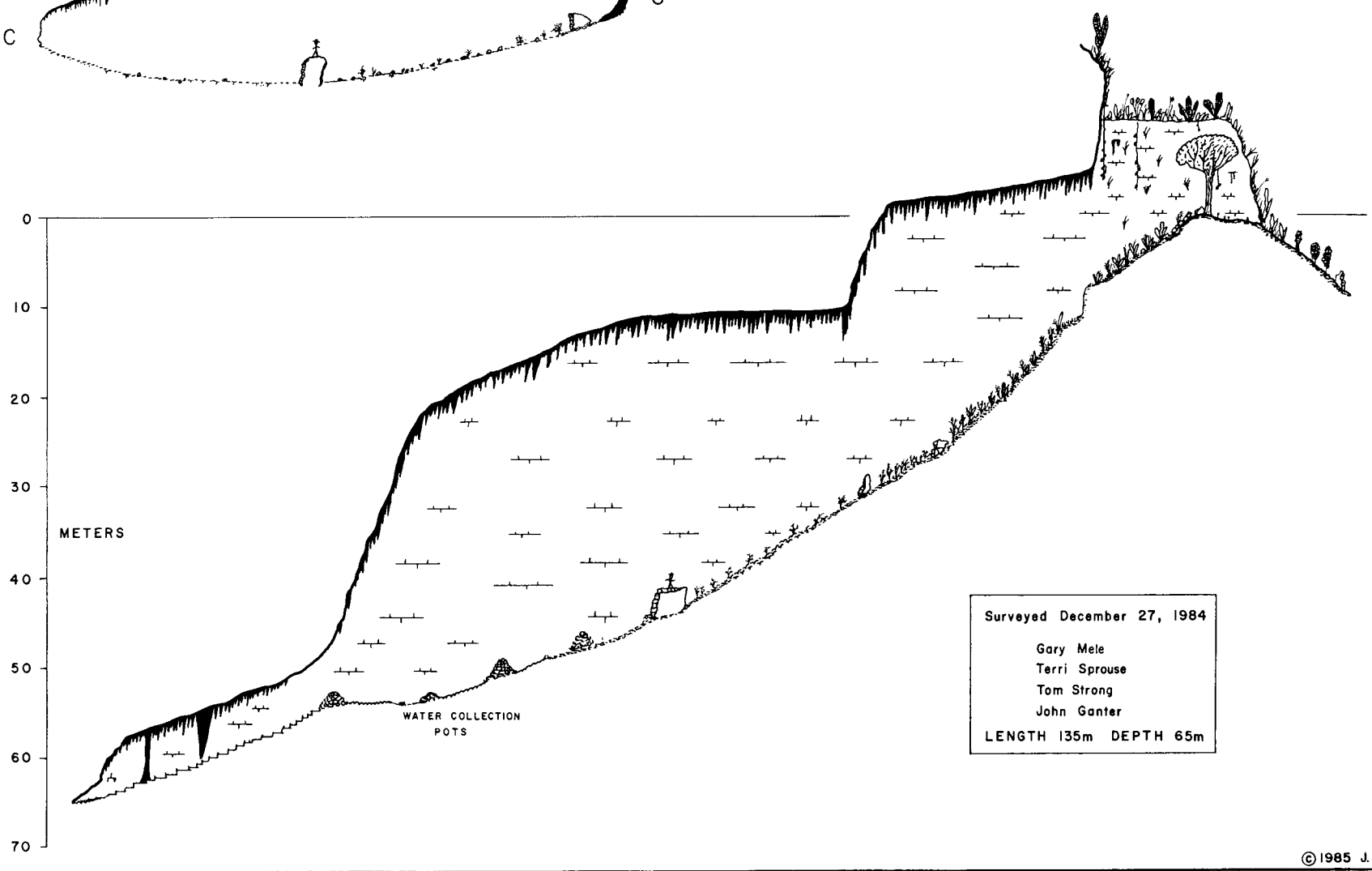
METERS







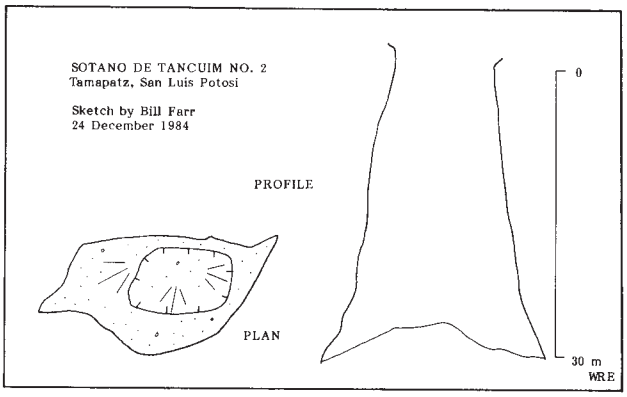




Surveyed December 27, 1984

Gary Mele
Terri Sprouse
Tom Strong
John Ganter

LENGTH 135m DEPTH 65m

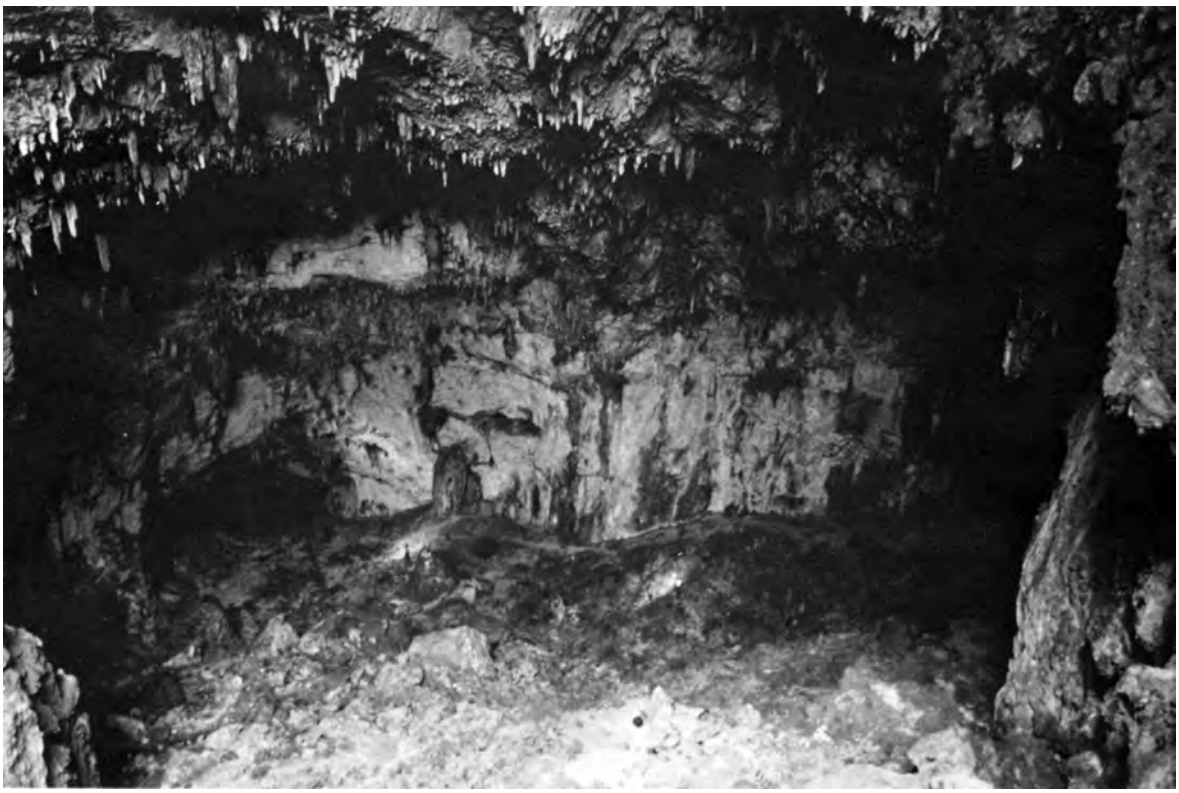


a possibility of a high lead on the far wall, but it would probably require a bolt climb. They named the cave Cueva del Santuario Adentro.

CUEVA DE EL CAÑON

One day, while most of the cavers were in Sótano de Tlamaya, Terry and Susie Raines were being led around to various caves by their faithful guide, Eudosio Hernandez. When Eudosio was 9 years old, he took Terry and others to Sótano de Tlamaya for the first time; that was in 1964. On this particular day he took them to Cueva de El Cañon. It is a very large cave located in the peak of a karst hill.

The following day John Ganter, Gary Mele, Terri Sprouse, and Tom Strong decided to survey it. Terry gave them a ride the 3 kilometers northeast of Tlamaya to the village of El Cañon. The entrance is 25 meters wide, and much of the cave's large chamber is visible from the entrance. A well-used trail switchbacks down the heavily vegetated entrance slope. This slope is quite steep at first, then turns to gently sloping flowstone. The ceiling is thick with stalactites. The bottom portion of the cave contains large stalagmites and rimstone dams. Near the back of the cave are several water-collection pots, most of which have flowstone deposits on them. Potsherds litter the floor. Near the entrance, along the north wall, are the remains of a 10-meter-high wooden scaffold built by local resident Eugenio Garcia in 1969 to reach some honeybee nests.



The large entrance chamber to Cueva de El Cañon. (Peter Sprouse)

CUEVA DE SAN PEDRO

On one of the off days between trips in Sótano de Tlamaya, Bill Farr, Mary Standifer, and Carol Vesely followed the new road out of Tlamaya up the mountain to the town of San Pedro Huitzquilico to look for caves. They were shown two pits in town and a cave that was northwest of the town. The first pit was near the school, hence the name Sótano de la Escuela de San Pedro. Bill Farr explored and sketched the 20-meter blind pit. The pit offsets to the west partway down, and is strewn with trash.

A large group returned to San Pedro the next day to have a look at the other pit, Sótano Escondido, and Cueva de San Pedro. The pit is situated on the southwest edge of the village. The entrance is 3 by 5 meters across and is almost completely obscured by vegetation. Bill explored the 26-meter drop to a dirt-floored chamber, with a short decorated passage extending off one side.

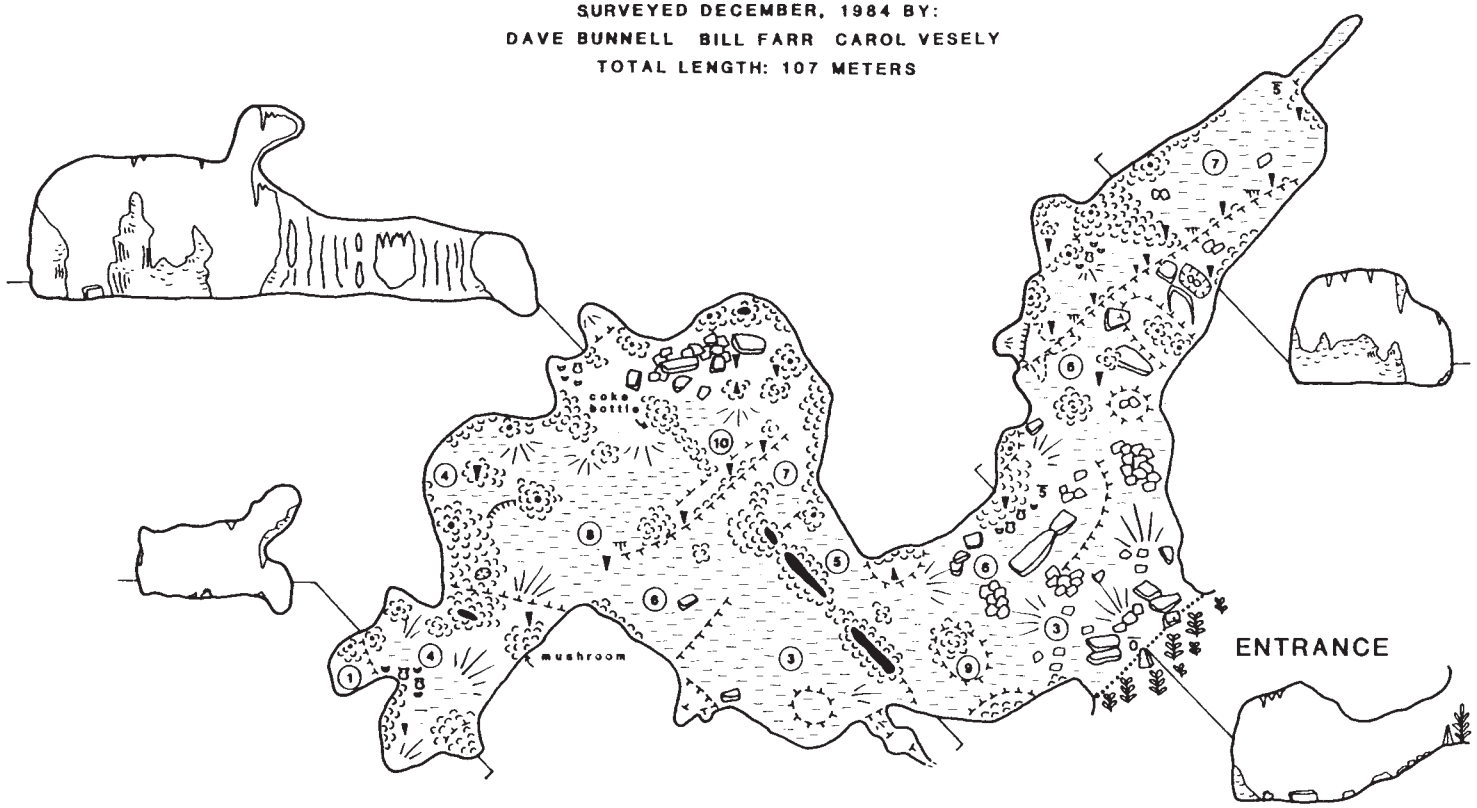
Cueva de San Pedro is located about 500 meters northwest of the village, over a pass. It is on the west side of a valley, at the base of a cone hill. The entrance is 8 meters wide and 3 meters high, and slopes down and splits into two well-decorated chambers. The cave is littered with broken pots and offerings left by locals.

Carol Vesely sketching formation chamber in Cueva de San Pedro. (Dave Bunnell)

CUEVA DE SAN PEDRO

SAN LUIS POTOSI, MEXICO

SURVEYED DECEMBER, 1984 BY:
DAVE BUNNELL BILL FARR CAROL VESELY
TOTAL LENGTH: 107 METERS



LEGEND

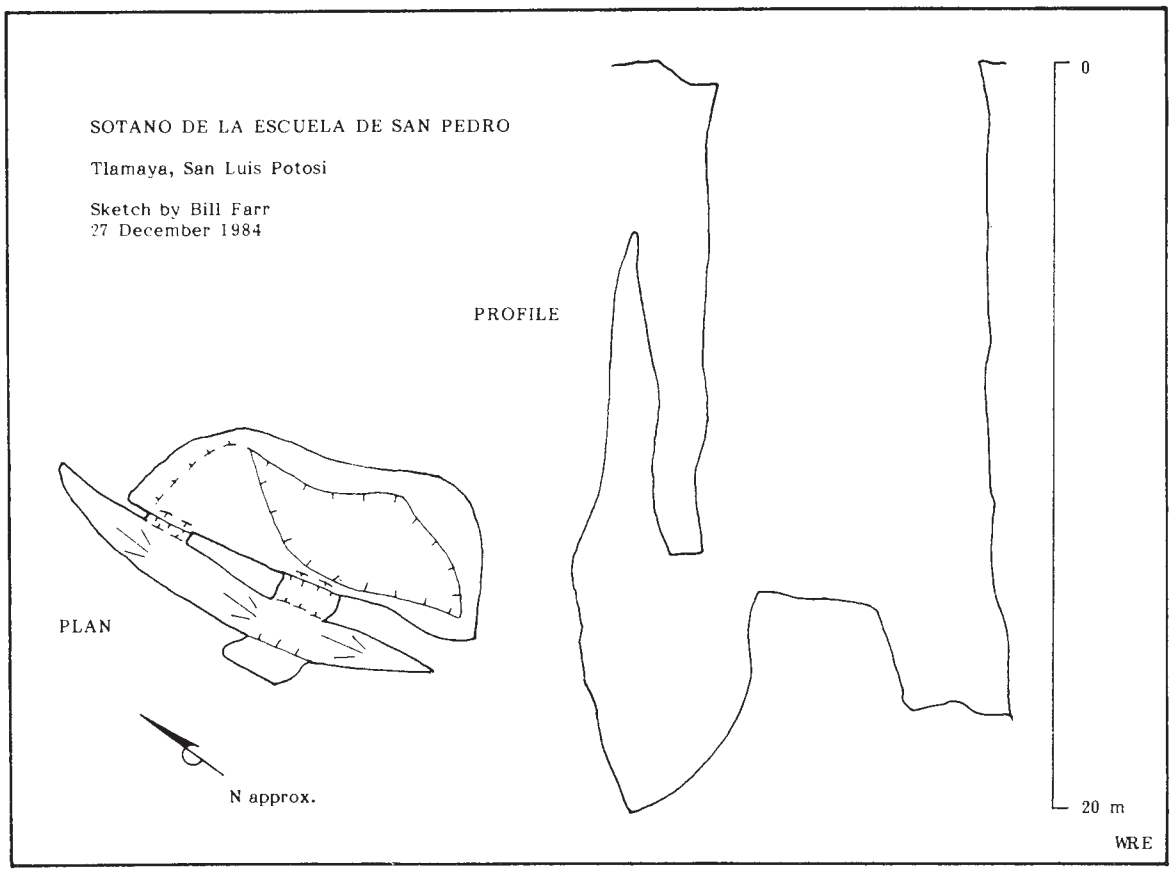
- LOWER LEVEL
- DRIP LINE
- DROP OR LEDGE
- CEILING CHANGE
- BREAKDOWN
- MUD OR CLAY
- SLOPE
- FLOWSTONE
- COLUMNS
- FORMATIONS
- SODA STRAWS
- POTTERY
- (8) CEILING HEIGHT (m)
- 3 DEPTH BELOW DATUM (m)

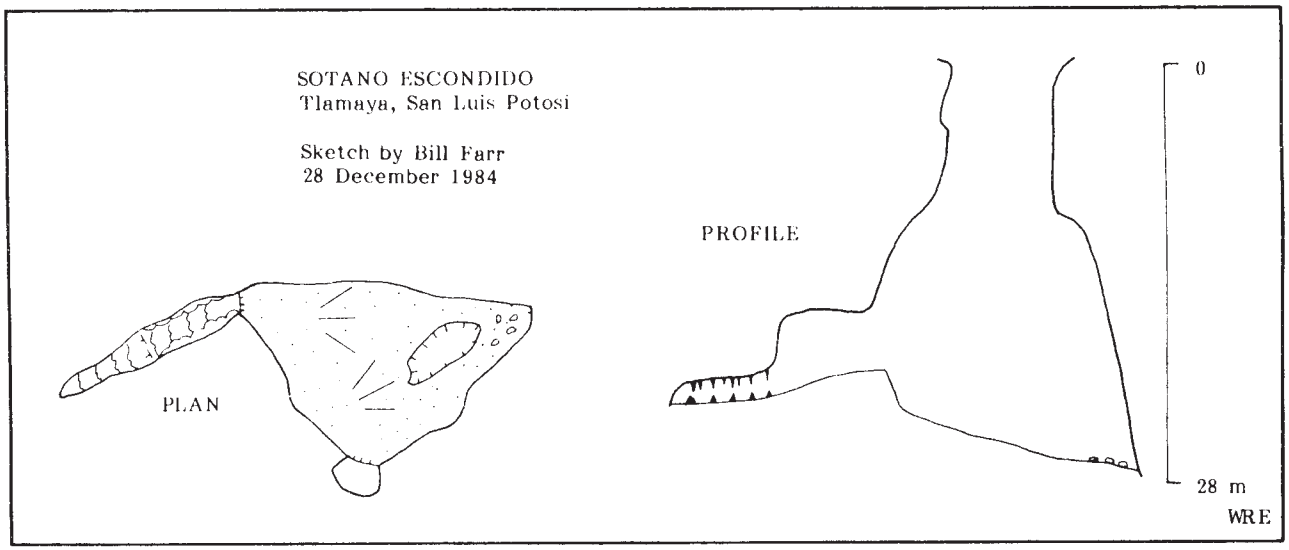
Nm

SCALE IN METERS

0 5 10 15 20

DRAFTED BY C.A.VESely



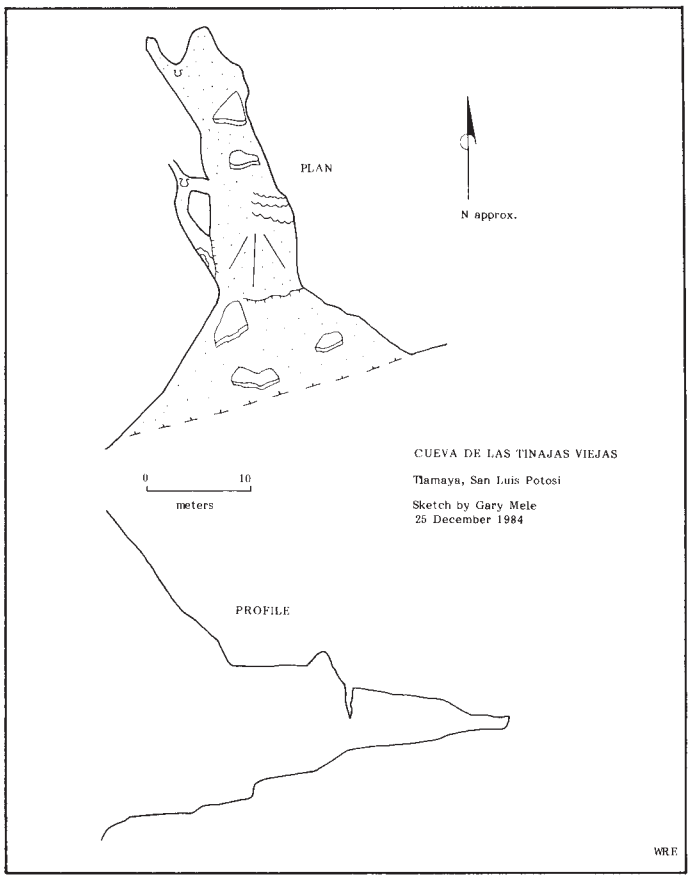


FURTHER DISCOVERIES

About 2 kilometers east-northeast of Tlamaya, Gary Mele located a cave situated in a cliff face. Cueva de las Tinajas Viejas has a large, 30-meter-diameter entrance that quickly narrows toward the rear. Potsherds and old, dry formations were seen inside. Gary also found Sotanito de la Puerta, located approximately 1 kilometer northeast of Tlamaya. He estimated the depth to be about 10 meters, but did not descend. John Ganter partial-

ly explored Cueva del Desagüe, named for its proximity to a drainage ditch. It is located on the south side of the Tlamaya road about 500 meters east of the arroyo containing Sótano de Huitzmolotitla. A 1-meter drop leads to a debris-covered ledge and then a 3-meter overhung drop, which has not been descended. Although no continuations were seen, the cave does take runoff during heavy rains. Bats were seen in the cave. Across the road from Cueva de El Cañon, Terry and Susie Raines mapped 80-meter long Cueva Tepametl.

Down near the Nacimiento del Río Huichihuayan, the main resurgence for the Xilitla area, a couple of caves were explored. Cueva del Cerro de la Ventana del Nacimiento consisted of one large room. John Ganter, Gary Mele, and Terry and Susie Raines visited Boca del Cañon. It is located at the end of a canyon and is entered by rappelling through a logjam. Terry pushed a crawlway for 20 meters or so. They made a sketch map of the cave.



RETURN TO TLAMAYA AREA

In February 1985, Marcus Buck and Mary Standifer returned to the Tlamaya area to check out some of the pits in the area. They mapped Cueva de las Ollas (13 meters long) near Siliatle, on a hill about 2 kilometers northwest of Tlamaya. Nearby they surveyed Cueva de Siliatle (60 meters long) and Cueva de la Nopalera (30 meters long). In the La Joya valley, about 600 meters east of Rancho Huitzmolotitla, Marcus explored one cave and found two pits. Cueva de La Joya is about 100 meters long. Sótano del Cementario No. 1 and No. 2 were estimated to be about 25 meters deep, but were not entered.

SOLO HIKER

In March 1985, Dave Doolin hiked on the trails from Tlamaya to La Parada. He located several caves in the Tlamaya area. Sótano de los Chorros is located in the Arroyo los Chorros valley and he estimated it to be 15 meters deep. Cueva de las Joyas is situated west of Tlamaya in the village of Las Joyas and is reported by locals to be 40 meters long. Sótanos de la Palangana No. 1, No. 2, No. 3 and Cueva de Palangana are located 3 kilometers northwest of Tlamaya. The pits are 6, 11, and 14 meters deep respectively, and the cave is a 9-meter-long collapsed shelter.

Hiking northwest to the La Parada valley, Dave found several caves near El Clavo. Cueva del Llano Grande has two entrances that lead into a circular room 20 meters across. Cueva Chiquita de Rancho Nuevo is a cave 25 meters long that slopes down and curves to the right before ending.

THE BULLETIN

Editors Peter and Terri Sprouse, are continuing work on the Xilitla Area Bulletin. Almost 300 cave descriptions have been written and pinpointed on the topo maps. Many of

these descriptions have maps to accompany them, and although many of them are already drafted, many are still in the "to be inked" category. James Reddell, who systematically records all biological collections in México, will be providing the biology chapter. Jerry Atkinson is working on the geology section. Reports of new cave discoveries and other information are still needed.

(This article was compiled from reports written by Dave Doolin, Bill Farr, John Ganter, Peter Sprouse, Terri Sprouse, and Carol Vesely.)

PROYECTO XILITLA

Una expedición fué hecha en diciembre de 1984 para completar la topografía del Sótano de Tlamaya. Aunque la topografia está completa hasta el sifón más bajo, hay un ramal en la parte superior del Big Room que continua inexplorado. La profundidad actual de la caverna es de 447 metros, y su longitud es de 3057 metros. Muchas otras cuevas fueron exploradas, incluyendo Cueva del Santuario Adentro, Cueva de El Cañon, y Cueva de San Pedro. Estas cuevas son basicamente largas cámaras o galerías que contienen bellas formaciones. Se hicieron algunos otros viajes al area en 1984 y 1985 en el cual muchas cuevas pequeñas fueron localizadas y exploradas.

Resurvey crew, Sótano de Tlamaya, Christmas 1984. (Terry Raines)

the stolen child

Where dips the rocky highland
Of limestone to the lake,
There lies a leafy entrance
Where snapping carbides wake
The drowsy winter bats;
There we've hid our rimstone vats,
Filled to measure
With gleaming crystal treasure.

Come away, O human child!
To the caves forever wild
With a hodag, hand in hand,
For the world's more full of hassles
than you can understand.

Where the waters sink from sight
From the mountains high above,
In pools amongst the 'mites
That scarce could bathe a glove,
We seek for slumbering creatures
And murmuring upon their forms
Give them unquiet dreams;
Soft recessive features
Gather lazily in spawning swarms
Slowly rippling cavern streams.

Come away, O human child!
To the caves forever wild
With a hodag, hand in hand
For the world's more full of hassles
than you can understand.

Where Vibram caresses on stygian
beaches
Awake the fishes without sight,
Far off in furthest reaches
We'll foot it all the night,
Rigging golden ropes,
Mingling 'biners and virgin hopes
Till the moon has taken flight;
To and fro we seek
And chase cascading waters,
While the world above slumbers in
it's quarters
and dreads the coming of the week.

Come away, O human child!
To the caves forever wild
With a hodag, hand in hand,
For the world's more full of hassles
than you can understand.

Away with us he's coming,
The carbide-eyed:
He'll feel no more the sunning
Of lizards on the warm hillside,
Or hear the trilling canyon wren
Sing peace into his breast,
Nor taste the autumn cedar scent
That swells within the chest.

For he comes, the human child,
To the caves forever wild
With a hodag, hand in hand,
From a world more full of hassles
than he can understand.

(With apologies to W.B. Yeats)

RESUMIDERO DE
T O X I N

by Carlos Lazcano Sahagún

Members of the Sociedad Mexicana de Exploraciones Subterraneas first heard of Resumidero de Toxin while checking caves in the high country of Cerro Grande along the Colima - Jalisco border. The locals spoke of a large "gruta" that no one had reached the bottom of. The cave is located near the small village of Toxin, to the north of Cerro Grande in the state of Jalisco.

One fine day we decided to quit Cerro Grande and investigate Resumidero de Toxin - so named by the locals because an arroyo is lost into the entrance. After descending through the fine forests of Cerro Grande, we reached the hot valley of Toxin. The friendly residents immediately showed us the cave entrance, 500 meters northeast of the village.

The entrance to the resumidero is small and requires a 6-meter downclimb. A wide gallery leads off, taking the flow of the Río Toxin during times of flood. This passage is characterized by well-consolidated mud, then passes through an area of large breakdown blocks. After progressing some 300 meters, we were stopped by a 9-meter drop. We turned around here due to lack of time, planning to return the following year.

In April 1984 we were back, seven strong, with a large amount of gear. Our team included Dalila Calvario, Ramon Espinasa, Sergio Lozada, Elena Roussillo-Perret, Carlos Lazcano, and two French cavers we had invited, Yves Bramoullé and Daniéle Bruzac. We spent two weeks camped at Toxin. During this time we explored deeper into the cave, shedding light on beautiful galleries that had been so long hidden. Our results showed the resumidero to be 3005 meters long and 95 meters deep, at this time the longest cave in Jalisco.

PASSAGE VARIETIES

The first of four large rooms in the cave is encountered after the second drop. It is 50 meters long and 15 meters wide and high. The walls are covered with flowstone and the floor with breakdown. The second large room is the Salon del Rat-Penat, 700 meters from the entrance. It is 40 meters long, 35 meters wide, and over 25 meters high. Mud cascades cover the walls and hundreds of bats take residence there.

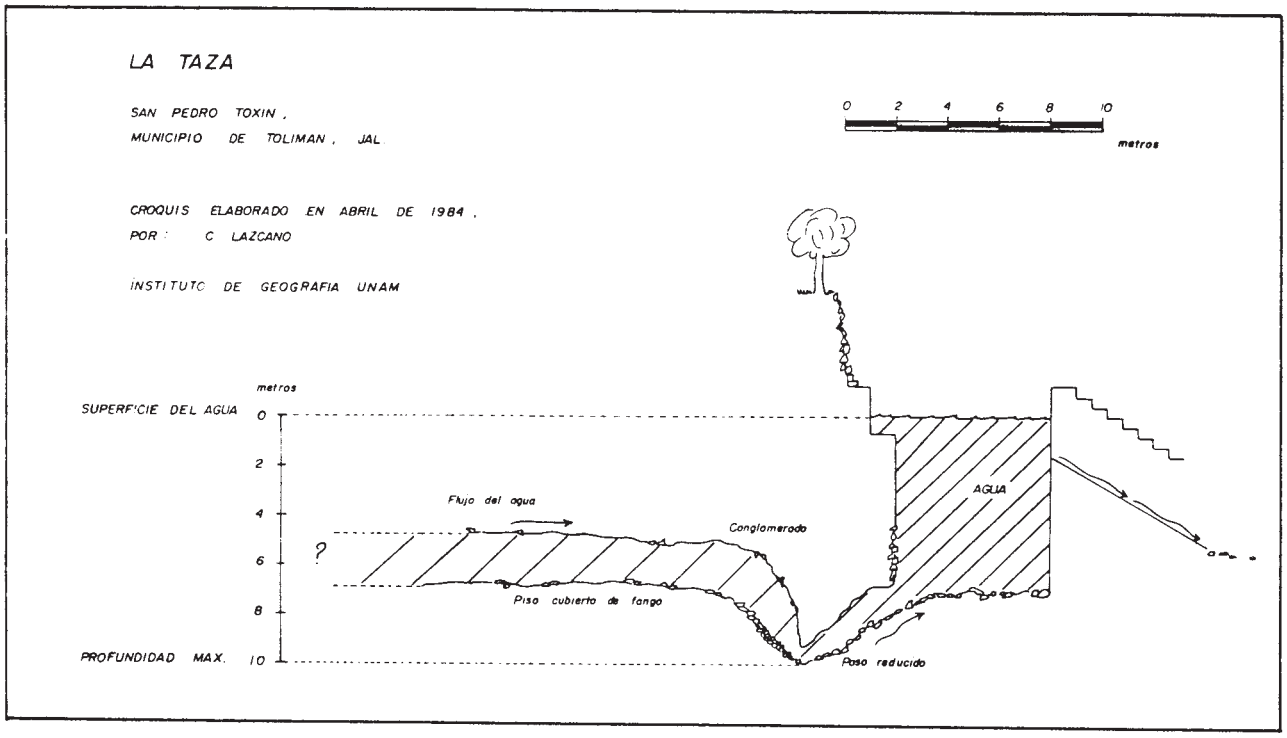
The largest room in the cave is called the Bisalon, 1.4 kilometers from the entrance. The name comes from the large ridge of mud which nearly divides the room in two. Its length is 150 meters, it has a maximum width of 50 meters, and the ceiling height varies between 5 and 10 meters. The floor is characterized by sandy flats, breakdown, and a well-defined stream trench. At the north end of the room the water flow has formed a perfect arch in the ceiling.

The fourth large room, the Salon del Infinito, is located 2.6 kilometers inside the cave, nearly at the end. It measures 50 meters long, 30 meters wide, and 10 meters high. It has a deep stream-channel between mud mounds.

In addition to big rooms, the cave has a lot of large passage that is often sandy-floored with some breakdown. Some of the large galleries are up to 100 meters in extent, and are for the most part easy walking passage. Some of the passages are meanders where the river flow twists and turns. Here the walls and ceiling are well sculptured, as if worked by expert artisans, and at other times resembling the tunnels of the Metro. One of these galleries contains a lake 23 meters long, which we crossed by swimming.

Beyond the Bisalon is the Galeria del Gran Colapso, where over time the falling of boulders from the ceiling has created a maze of rocks. Entrance to the Gran Colapso is a squeeze by a huge block 16 meters long, 7 meters wide, and 8 meters high. Farther along is the Canon de Elena, a straight

Opposite: Potholes in Resumidero de Toxin. (Carlos Lazcano)

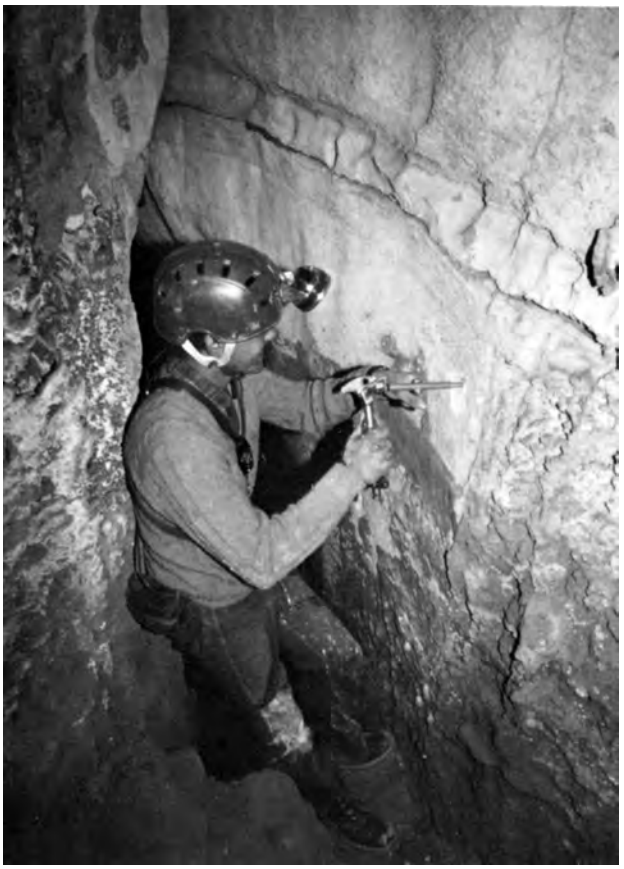


canyon 100 meters long, 7 meters high, and with walls that ascend into darkness that our lights could not penetrate.

Although most of the cave is quite large, there are various squeezes and crawls. The cave ends in a sump, which we have no plans to push due to the bad air, probably methane, at the bottom. Some side leads also ended in sumps. The longest side passage explored was 115 meters in extent. There are two leads that remain to be explored.

LA TAZA

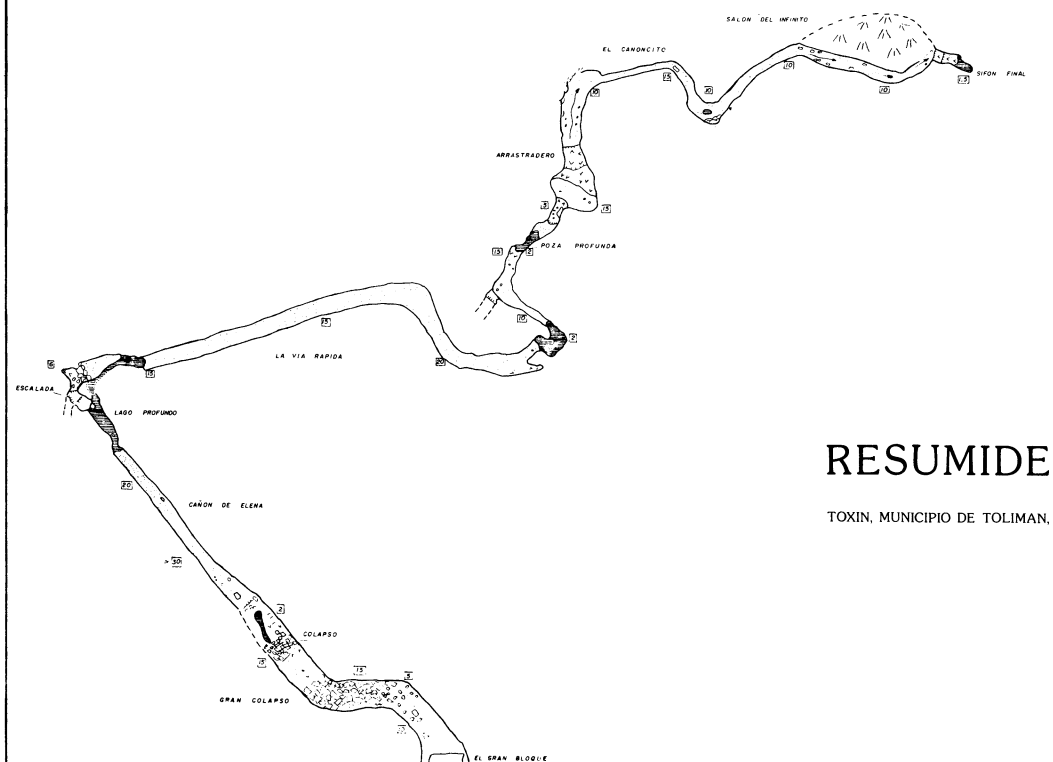
The resurgence to Resumidero de Toxin is situated 9 kilometers to the north and 400 meters lower. Called La Taza, this spring has a flow of 300 liters per second. At this "ojo de agua" an enclosure has been constructed to create a pool, so now the actual spring is 8 meters below the water surface. Using diving gear, Carlos was able to penetrate 50 meters into the narrow conduit, without reaching any airspace. The water was very clear upon entering, but during



Ramón Espinasa setting a bolt in a pit near Toxin. (Carlos Lazcano)

RESUMIDERO DE TOXIN

TOXIN, MUNICIPIO DE TOLIMAN, JALISCO



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PLANO ELABORADO CON SUUNTOS Y CINTA
EN MARZO de 1983 ,
Y ABRIL de 1984 ,

POR : C. LAZCANO
Y. BRAMOULLE
D. BRUZAC
D. CALVARIO
R. ESPINASA
S. LOZADA
L.M. LUNA
E. ROUSSILLO-PERRET

DIBUJADO POR : C. LAZCANO
E. ROUSSILLO-PERRET

CAMINAMIENTO TOPOGRAFICO GRAFICADO POR EL PROGRAMA
" ELLIPSE " EL 26 de MAYO de 1984

- LONGITUD : 3 005 metros
- PROFUNDIDAD : 95 metros

0 50 100 150 200 250

METROS

SOCIEDAD MEXICANA DE EXPLORACIONES SUBTERRANEAS

INSTITUTO DE GEOGRAFIA — UNAM

his return the silt reduced the visibility to less than a meter. Close to the entrance is a squeeze where it is necessary to remove tanks to fit through. Another push is planned at this resurgence.

Additionally, fifteen other caves were explored in the area, mostly shallow pits. Resumidero del Puertecito is a very vertical cave that was explored down four drops of 10, 28, 58, and 17 meters to a depth of 123 meters. Cueva de los Monos is a cave 100 meters long that is very well decorated.

RESUMIDERO DE TOXIN

El Resumidero de Toxin se localiza cerca de la pequeña villa de Toxin, al norte del Cerro Grande en el estado de Jalisco. Un arroyo se hunde en una pequeña entrada vertical. En el fondo, el pasaje es largo y continua por más de 3 kilometros hasta un sifón, en el cual no hay planes de bucearlo en el futuro debido a la presencia de aire enrarecido en el fondo, probablemente metano. Dos ramales en esta cueva continuan inexplorados. La resurgencia de Toxin, llamada La Taza, se localiza a 9 kilómetros al norte, y 400 metros más abajo. La Taza tiene flujo de agua de 30 litros por segundo. Utilizando equipo de buceo, el manantial ha sido penetrado hasta 50 metros sin llegar a alcanzar un punto con aire. Otras 15 cuevas, la mayoría sótanos bajos, fueron checadas en el área. Resumidero del Puertecito fue explorado hacia abajo 4 tiros hasta una profundidad de 123 metros. La Cueva de los Monos, una cueva muy bien decorada, se encontró de 100 metros de largo.

Cañon de Toxin with Cerro Grande on the right and Cerro de Enmedio on the left. (Carlos Lazcano)

Proyecto Espeleológico Purificación

1984 - 1985

by Peter Sprouse

During a fifteen month period beginning in the fall of 1984, exploration continued in many different parts of the Purificación karst area in the states of Tamaulipas and Nuevo León. Two trips were made to Sistema Purificación, one of which involved a 5-day camp nearly 3 kilometers inside. New surveys in Sistema Purificación brought the length of the system up to 55,078 meters, an increase of 3908 meters. It is México's longest cave, a position it has held since the connection of Cueva del Brinco and Cueva de Infiernillo in 1978.

Southeast of Sistema Purificación, two expeditions concentrated on Cueva del Tecolote, increasing its length to 7015 meters and its depth to 231 meters. A new discovery nearby called Cueva de la Llorona was pushed to 2256 meters in length and 398 meters in depth. Farther south, Sótano de San Marcos was mapped; it is 1019 meters long. Additionally, numerous other caves were discovered or extended in the area.

THE PURIFICACION KARST

The Purificación karst area covers approximately 2500 square kilometers of the front ranges of the Sierra Madre west of Ciudad Victoria. Limestone begins at an elevation of 500 meters in the east and reaches a height of 3500 meters in the western reaches. The major systems explored thus far are found in the eastern ridges, where the coastal weather tends to drop more rain. The drier western mountains exhibit mostly blind-pit development.

Cave exploration in the Purificación area by AMCS members began around 1971, but it was not until 1977 that the Proyecto Espeleológico Purificación was conceived. The project goal is to coordinate cave exploration and research in the area and to produce a detailed area report. Around 150 cave entrances have thus far been tagged and documented, some of which have been joined into cave systems. Sistema Purificación, for example, currently has 11 known entrances. A major project goal is the extension and unification of the area caves, particularly along the eastern ridges, where conditions are very favorable to long cave development.

SISTEMA PURIFICACION

A 13-member PEP expedition camped inside Sistema Purificación during the period 17-22 March 1985. They divided into two teams, and four cavers proceeded into Camp I, 500 meters inside the Cueva de Infiernillo entrance, while nine cavers continued to Camp II, nearly 3 kilometers inside.

At Camp I, Jerry Atkinson, Jeff Horowitz, Patty Kambesis, and Cyndie Walck settled in on the sand piles near the sump lakes that are the lowest point in the system. From there they were able to work in various parts of the Confusion Tubes, Infiernillo's multi-level maze section. At the southwestern edge of the Tubes, they first investigated the Sand Tubes, which leave the Misty Borehole near the Hose Tubes. They mapped two main routes in these tubes, with several leads remaining - as is often the case in the Confusion Tubes.

In the southeast portion of the Tubes, exploration was continued in the upstream Río Shumate, a small stream reached from the Balcony Borehole. They soon intersected one of Infiernillo's main south-trending passages at the Bucket, paralleling a similar connection made in November 1982. Some further loops were made in the heart of the Tubes near the Complex Dome.

Opposite: Crystal waters of the Valkyrie River, Brinco. (Peter Sprouse)

CAMP II

The remaining crew of nine cavers arrived at Camp II after a long journey through the Confusion Tubes and the South Trunk, which involved squeezing duffles through the narrow Breakdown Maze. Leveling the sand at Cozumel Beach, each caver claimed a slot for the first occupation of this camp since April 1979. Here were all the amenities, including two lakes, one for drinking water and one for bathing. The Camp II crew consisted of Marcus Buck, Dave Bunnell, Jim Feely, Louise Hose, Peter Keys, Dale Pate, Jim Pisarowicz, Peter Sprouse, and Terri Sprouse.

The prime lead in the Camp II area was the Windsump, a windy cobble choke blasted open by a crew from Camp I on the previous Infiernillo trip in November 1982. This lead seemed to offer the best hope of connecting to the Columbia, the cave's major south-trending lead, reasonably accessible only by a long trip from the Cueva del Brinco entrance high above. On 18 March, Dale, Louise, and Jim Feely began the survey through the Windsump's small confines. They mapped a fairly tortuous 102 meters, getting the worst survey out of the way. Meanwhile, Terri, Marcus, and Jim Pisarowicz surveyed in a sandy crawl that

Duffle hauling on Camp II trip, Infiernillo. (Jim Feely)

Louise Hose traversing the Windsump passage. (Dave Bunnell)

took off to the left just before the Windsump. They were able to map 244 meters and they had some wind, though their passages were mazy and lacked a major route.

BREAKDOWN RIVER

The following day Terri, Marcus, and Jim Feely continued the survey past the Windsump. The passage gradually got bigger as it headed south. They passed one lead on the left side that ascended to breakdown, which they did not push. Farther on, another side lead on the left seemed to take the air. But they continued on in the main passage, which trended down slightly and made an abrupt right-hand reversal around to the north. After a long crawl over death coral they suddenly intersected a large borehole with a flowing river trending north. Deciding to leave this for another day, they backtracked to the side lead that took air and did a few shots down it to a shallow pool. Their survey was 504 meters, the best of the trip.

On 20 March, Terri, Dale, Dave, Louise, and Jim Feely returned to map the new Breakdown River. Upstream (south) and downstream both led to clear, cold sumps, with the river between them flowing below large breakdown blocks. This survey added another 394 meters. The source and destination of this new western river are not apparent; the only other known flowing stream that might be related is the Tokamak River, 1700 meters to the south.

SHEER NON-CONNECTION

Back at the blowing side lead, Marcus, Peter Keys, and Peter Sprouse continued the survey to the south. They tied up an amazingly tight tube loop, then ascended a ramp to the east. At the top, the passage went

both north and south. North led shortly to a blowing breakdown choke, and south went to a low passage blocked by thin breakdown slabs. The airflow and echo drove them to bashing rocks, and after a half hour's hammer work they were through. They again climbed up a steep ramp to the left, then were into a low, wide southward continuation.

After what seemed like endless crawling, the ceiling got higher, but only briefly. They wrapped up the survey after 430 meters, and Marcus checked ahead 50 meters to a pool. It was dubbed Doesn't Quit Yet, since it didn't. Later the computer plots indicated this passage was lying right on top of the Columbia, shadowing it a few meters above, yet not connecting.

CAMP AREA

Close to camp, the Gypsum Passage was investigated by Dave and the two Peters. This is a dry upper level that looped in, down numerous pits, to the maze complex east of camp. Just to the south, they looked at the source of the Isopod River, which flows by camp. No progress could be made there in the breakdown. Likewise breakdown stopped them when they tried to push the north end of the Netherhall, essentially the bottom of a huge breakdown talus mountain. These surveys added 284 meters to the length of the cave.

SOUTH OF THE NETHERHALL

Several teams made the 150-meter ascent over the Netherhall to work leads off the Communion Hall, where the Brinco-Infiernillo connection had been tied in back in 1978. In the Arne Saknussem Borehole, Dale, Louise, and Dave mapped several additional loops for 270 meters of survey. One lower-level lead near the Nile, the Giant Enigma, was mapped by Jim Pisarowicz, Peter Keys, and Peter Sprouse. Although this eventually made a loop back into known passage at the Scorcini Connection, several intriguing leads were passed, especially a pit lead that took water and wind. After 392 meters of survey, they shot pictures on the way up to the Nile. While getting into position for a photo, Jim slipped and got a sliver of rock in his hand. The others tried to remove the sliver with Swiss army knives but could not. Thus Jim was somewhat disabled for the remainder of the expedition. Peter Keys had also bruised his hand in a fall, but it was fortunate at least that they could both still move through the cave all right.

In the last day's survey, two teams again crossed over the Netherhall. Dale, Dave, and Louise pushed Goes 2, a south-trending lead off Goes 1 that had not been looked at since 1978. This had good airflow, which they followed for 146 meters before quitting for the day. Over towards the Nile, Marcus, Terri, and Peter Sprouse cleaned up minor leads and loops to gain an additional 144 meters of survey.

The team packed up after 5 days, hauling out all trash and spent carbide as always. The expedition had lengthened Sistema Purificación by 3352 meters, making it 54,522 meters long.

CUEVA DEL BRINCO

Two months later, in May 1985, a PEP crew returned to the high pine forests near Cueva del Brinco in the upper reaches of the system. First an ambitious push was launched off to the Southbound Borehole, the southward extension of the Columbia 600 meters below the Brinco entrance. On 27 May eight cavers donned their wetsuits in the Dressing Room: Paul Fambro, John Ganter, Jim Goodbar, Susan Raines, Terry Raines, Peter Sprouse, Terri Sprouse, and Lynne Thompson. It was late in the season, so they weren't too surprised to find water levels up in the cave. At Flowstone Falls, free-climbing was tricky due to the cascade of spray that doused the lights of the carbide cavers. At the halfway point, Fool's Falls, Paul felt ill, and it was decided that Terri and

Lynne would accompany him out. That left five cavers to continue on, down through the dry Medusa's Maze and Yawndwanaland to the Southbound Borehole.

At that point, 4 kilometers into the cave and behind their projected schedule, they opted for a nearby lead rather than continuing on to the end of the Borehole. The lead jogged west, then turned south along the familiar regional trend. Paralleling the Southbound Borehole, they followed the crest of an anticline visible in the ceiling. After 330 meters in Anticline Alley, they halted the survey at a lake, which Terry waded into for a ways to determine that it continued.

The trip out was dreary, since most of the crew felt somewhat ill. But everyone got a second wind with the completion of a daily time cycle in the refreshing Río Verde series, and the entrance was reached after 27 hours of caving.

VALKYRIE RIVER

About 150 meters below the Entrada de los Franceses, highest to the system, is the Valkyrie River. This stream originates from the south and trends toward the World Beyond trunk. On 30 May Duwain Whitis, Terry Raines, and Peter Sprouse continued a survey off the downstream portion, where Don Coons had explored ahead in 1981. This led to a sizable room, but the passage later pinched after 226 meters of survey. This gave 556 meters of new survey in Sistema Purificación for the trip, making the system 55,078 meters long.

Other caves were investigated in the immediate vicinity. Cueva del Borrego, just to the south of the Franceses entrance, was the object of another confusing survey. Below Totem City, Duwain lost his pants in the tight Whitass Pit, which fortunately was bypassed when they looped up through the breakdown back at the totems. Their 94-meter survey made Borrego 657 meters long.

Up on the side of Cerro Zapatero, Duwain discovered a 20-meter-long blowing cave named Cueva del Sotol. The breeze apparently was coming from the nearby second entrance.

Up the Sierpes valley south of Brinco, numerous filled sinks and entrances were investigated, but none went.

CUEVA DEL TECOLOTE

The impressive entrance to Cueva del Tecolote takes one of the largest drainages of any cave entrance in the Purificación area. It is situated at 1450 meters elevation in a wide valley near the eastern edge of the sierras.

A normally dry arroyo drains the village of Los San Pedro and tumbles over a short drop just beyond the dripline of the cave. The locals have installed two lengths of heavy-machinery tread as a ladder to reach the bottom, so that water may be taken from the cave in dry periods. Much of the cave water, however, is polluted by runoff from the town.

Sheila Balsdon, Charles Fromén, and others from Houston were the first cavers to visit Tecolote. They explored about 300 meters to a lake that appeared to sump. PEP members began a survey in the spring of 1980, and were able to push the cave to a length of 1341 meters and a depth of 106 meters. Further pushes in 1982 and 1984 increased the length to 1977 meters, with the survey halting at the top of a drop into a large room.

In November 1984 a large group of cavers arrived at Tecolote to continue exploration. The eight drops and handlines were rigged down to the virgin drop at the end of the Ides March, and Paul Fambro and Paul Smith descended it for 25 meters and reconned the bottom. On a subsequent trip Margaret Hart, Peter Keys, and Dale Pate mapped down this 20-meter drop into the Salón del Puente, a long chamber crossed by a natural bridge. At the far side two leads trended downward, and a steep flowstone slope ascended to the cave's previous level. They chose the left

drain in the floor, which they mapped for 100 meters to a pinch.

RUSSIAN DANCER

Meanwhile a second survey team consisting of Mark Minton, Paul Smith, Peter Sprouse, and Terri Sprouse had leapfrogged past them up the flowstone slope, where they found an apparent upstream feeder into the Salón del Puente. This passage, of comfortable borehole dimensions, contained an incised floor channel between dark mudbanks. Paul investigated a high lead on the right wall, which he described as "sharp." The main passage intersected the base of a large room that they dubbed Anotherhall. Two leads extended off this breakdown room. The left lead was followed for several survey shots over muddy flowstone, and it continued. The right lead was a continuation of the original passage over the breakdown in Anotherhall, after which it descended to a low, wide, sandy crawl. Due to the squatting posture the cavers assumed while mapping it, this was named the Russian Dancer Borehole. After a few shots the ceiling got higher at a room lined with high sand bars. Soon the passage was floored in flowstone, and helictite bushes hung off the ceiling. The passage width increased to 30 meters at a junction where a wet side passage took off on the right.

The Dark Ages, beginning of the boreholes in Tecolote. (Peter Sprouse)

The main passage became even wider to form the huge Rimstone Gallery, which appeared to end until a small opening into a 2-meter drop was located. This was left for a later trip, since the team had already mapped 900 meters that day. This extension radically changed the nature of the cave map.

Back in the upper reaches of the cave, an area was investigated off the top of the Flowstone Falls Drop, the fifth drop in the cave. Jerry Atkinson, Roy Glaser, Erika Heinen, Mark Minton, Bill Mixon, Nancy Weaver, and Alan Williams worked in this area, known as the Bat Room. Two different crawls were checked, and Mark and Alan put up a lead climb into a dome, which didn't go. This expedition increased the length of Tecolote to 3301 meters, and the depth to 211 meters. Of biological interest, a new species of schizomid was discovered in the cave.

Cueva de la Tinaja, a cave on the hill north of Tecolote that was previously explored by cavers from Houston, was surveyed on this trip. It consists of several decorated rooms. Other minor caves mapped in the vicinity were Cueva de la Sala Bonita, Cueva de los Helechos, Cueva del Terminal, and Cueva del Encino Mágico.

THE BIG STUFF

In November 1985, twenty cavers participated in the return expedition to Cueva del Tecolote. Present for varying lengths of time were Sheila Balsdon, David Dodge, Paul Fambro, Bill Farr, Jim Goodbar, Erika Heinen, Peter Keys, Mark Minton, Dale Pate, Susan Raines, Terry Raines, Mary Sakry, Peter Sprouse, Terri Sprouse, Mauricio Tapie, Pablo Tapie, Cyndie Walck, Nancy Weaver, and Jack White. On the first caving day nine cavers went in to rig the cave and to form two survey crews. Terri, Cyndie, Jim, and Peter Keys mapped down the right-hand drain in the Salón del Puente. This flowstone route gradually became smaller, and they ended the survey after 236 meters. It was explored 100 meters farther, and it does continue,

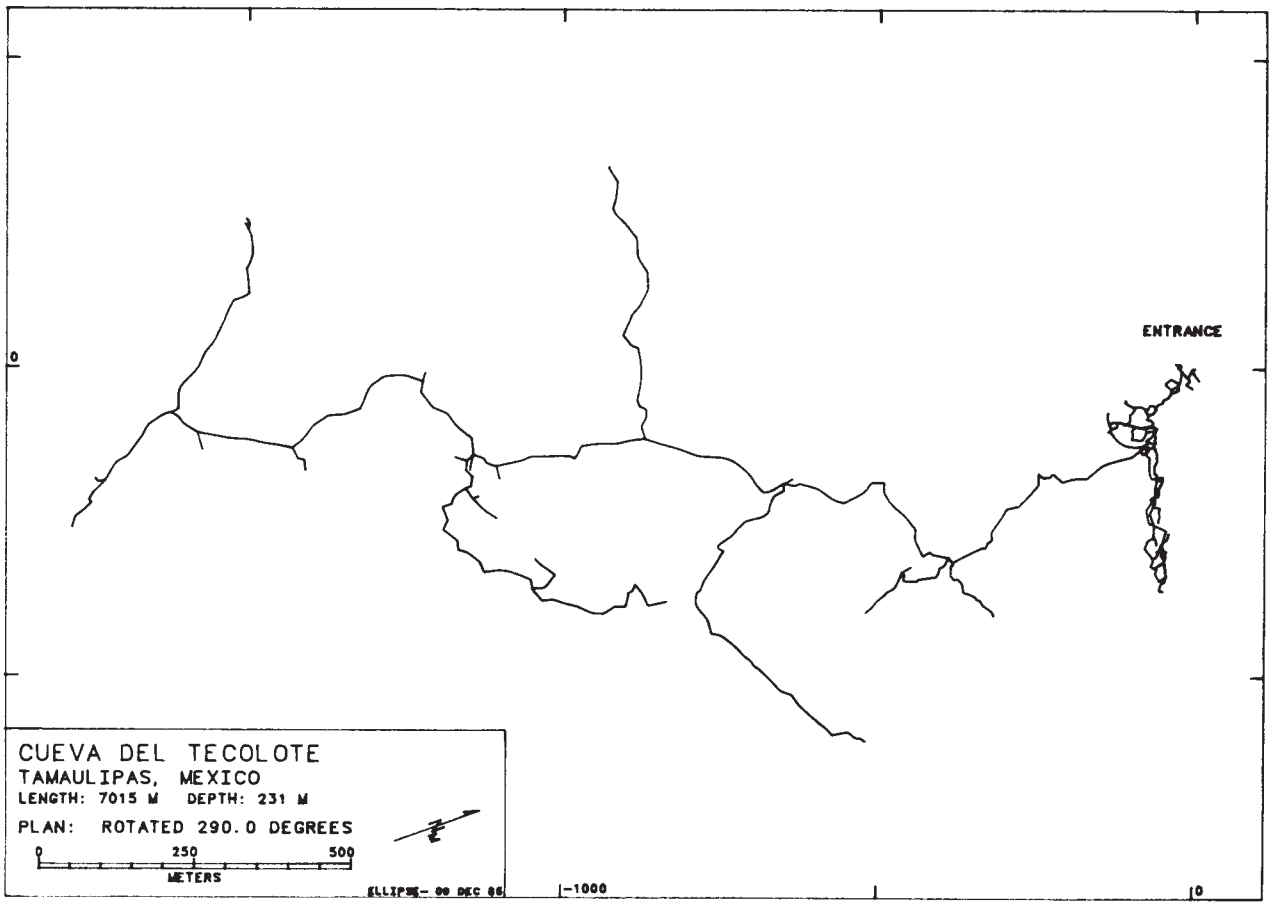
The 1984 expedition to Tecolote ended in the wide Rimstone Gallery. (Peter Sprouse)

although it is small. Their survey established a new depth for the cave, 231 meters below the surface.

Meanwhile, Bill, Carol, Jack, Sheila, and Peter Sprouse went on to the end of the Rimstone Gallery to push beyond the drop left from the previous year. Below the narrow 2-meter ladder-drop, the passage soon opened up again to enormous proportions. The mud and flowstone-floored Fantasia Borehole descended gradually to the south, often 40 meters wide and 20 meters nigh. After several hundred meters they encountered a major junction where a drain curved down to the left, while a level borehole continued on to the right. First checking down to the left, they saw a wide, clean-scoured passage taking off. Then they returned to the right-hand borehole, where the long survey shots continued over undulating mounds of mud and gravel. Eventually this led to a climbdown, where Bill checked ahead and reported four small leads, two upstream and two downstream. But to the left at the top of the climbdown was a long slope leading up to more mud-floored borehole, so the survey was continued up there. This Mud Dune Borehole led to another "T" junction, later named Pepsi Junction for the refresco Peter Keys brought in. To the left at this point the passage quickly became a crawl which seemed to have airflow. To the right, more large passage continued, which was left for the next trip. These various boreholes produced 782 meters of survey that day.

THE BOREHOLES CONTINUE

Two days later, on 26 November, three survey teams were organized to follow up on the new discoveries. Dale, Bill, Carol, Nancy, and Mark followed the left-hand drain, which they named the Spine Line. This passage curved around to the northeast, and was often partially blocked by



massive wall pendants that formed obstacles across the large passage. Numerous side leads were passed along the way. A lower level lead near the start of the survey continued as a wet stoopway. In the same area, a lead on the left side was mapped a short way to breakdown, and was explored 30 meters farther. A second lead on the left side also went into heavy breakdown, and could connect to the first breakdown lead. Shortly before stopping, they passed a downtrending lead on the left side. When their survey tape broke, they turned around in going passage, having mapped 804 meters.

The second team, Terri, Jack, Sheila, and Peter Keys, went on back to Pepsi Junction at the end of the Mud Dune Borehole. They began to survey southwest in the continuation of the borehole, where breakdown blocks began to dominate the floor. Soon they came to a large junction room, Petzl Junction. Here they chose the left route, traversing a breakdown ridge that sloped down on either side toward the walls. This borehole, which they named the Millenium Falcon, eventually terminated in a flowstone fill. Along the right side of the passage near its end was a steep flowstone slope leading into an alcove, which Peter Keys checked out in a daring alpine slide. Their survey for the day was 541 meters.

The third team of the day consisted of Cyndie, Jim, Mauricio, Pablo, and Peter Sprouse. They spent three hours and 270 flashbulbs photographing the boreholes before joining the second team. They elected to map the borehole that led to the right from Petzl Junction. This was a large passage with an occasional stoopway or crawl. Breakdown became more common, finally filling the passage all the way to the ceiling, forming a long slope. At the top, no way on could be

Passages in the Millenium Falcon are developed in brecciated limestone. (Peter Sprouse)

found through the breakdown. So they turned around after 375 meters of survey.

CONFUSION BOREHOLES

Two teams descended the stairstep drops into Tecolote after a day of rest and gear repair. Paul, Mark, and Nancy surveyed in the wet side-passage near the Rimstone Gallery, a lead left from the previous year. They immediately abandoned the water and climbed into an ascending passage on the left, which led into a large passage, the Extreme Borehole. With the help of Sheila, Jack, and Peter Sprouse as a leapfrog team, over 400 meters of wide borehole was mapped to a small vertical squeeze with airflow.

Nancy and Mark then left, while the four others picked up the survey of a side passage off Anotherhall, left from 1984. This walking-size passage descended gradually to where it split into two levels. The lower level was a steeply descending borehole, but was not explored. The upper route continued straight and level to a "Y" intersection that was soon named Doll's Leg Junction. To the left the way went past a crawl on the left side, to larger passage with a large pit on the right side. A borehole also continued straight ahead. Paul descended the pit, the Major Abyss, and reported a clean-washed borehole.

The right turn at Doll's Leg Junction led to a room overlooking the Major Abyss, where there were three separate passages leading off. Plots of the survey data indicate that the Spine Line may be headed for a connection into this area. Faced with a difficult choice between many good leads, the cavers chose the left route from Doll's Leg Junction, mapping into the large borehole that went off the top of the Major Abyss. This was a flowstone and mud floored passage that ascended gradually and trended east. After passing a side lead on the right, the Serious Borehole stayed relatively uniform, gradually picking up breakdown. The breakdown became steeper, topping out in a wide trunk and descending steeply down a long slope on the far side. At the bottom was another side lead on the right that led back parallel to the way they had come in. Ahead was the sound of falling water, splashing down a fine flowstone mound capped by a tall tower, the Goddess of Liberty. This was the most water flow yet seen in Tecolote, but it mysteriously disappeared in rimstone pools, leaving the area just downslope quite dry. A few shots beyond the goddess, they decided to call it quits, leaving the continuing borehole for the next trip. Their survey of 673 meters made Cueva del Tecolote 7015 meters long, currently the tenth longest in México. Derigging and more photography then wrapped up the work in the cave.

Some of the small caves tagged and mapped in the area on this trip included Cueva de la Mandarina, Cueva del Cactus Pendiente, Cueva Paralela, Cueva de El Venado, and Cueva del Cienpie. Near the village sawmill, Cueva del Aserrín was explored for about 100 meters to a pinch.

A NEW FIND

While talking with a local resident during the 1984 Tecolote expedition, Peter Sprouse found out about a cave at a place called La Llorona. La

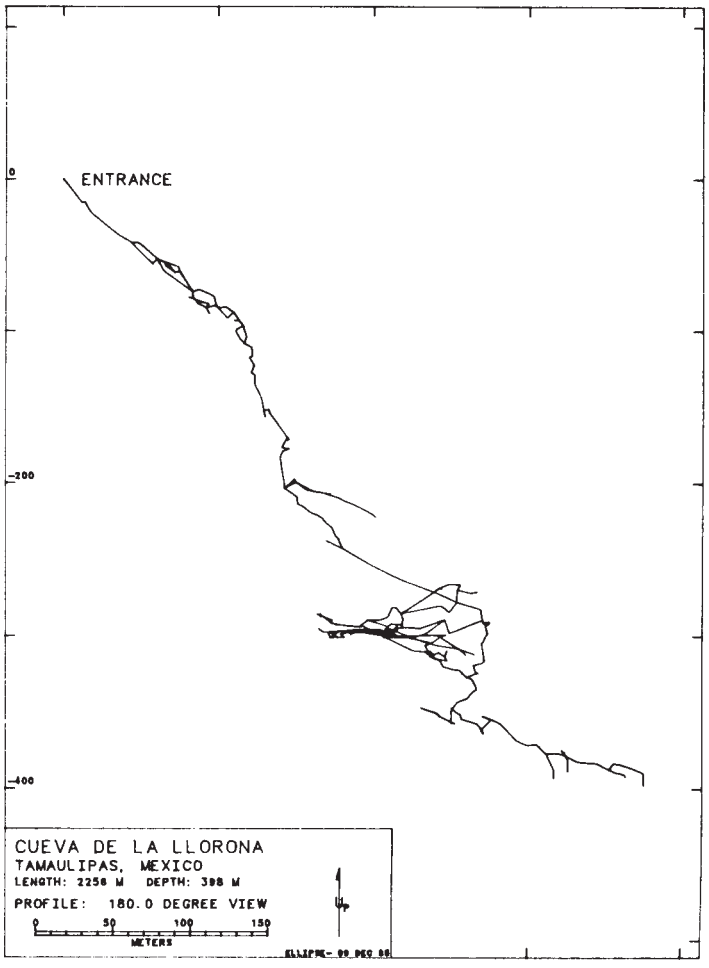
Scorpion Falls, one of the many free-climbs in Cueva de la Llorona. (Peter Sprouse)

Llorona is the popular Mexican legend of the ghost of Malinche, the ally of Hernán Cortés. On 20 November 1984 the cavers were guided to the entrance, which is situated between Cueva del Tecolote and Sótano de Las Calenturas. The entrance is in an obscure sink on a hillside, and begins a steady descent immediately. Profusely covered in flowstone, Cueva de la Llorona descends at a 35-degree angle, periodically interrupted by rope drops. The first day's survey ended at a climb-up at a depth of 90 meters.

On 23 November the push was continued down more drops and one climb to a large room that was named Knots Landing. Below, a steeply descending lead called Ragtime Boulevard ended at a drop overlooking a large passage that appeared to extend in two directions. The survey of Llorona then showed a length of 919 meters and a depth of 273 meters.

Jerry Atkinson, Paul Fambro, Erika Heinan, Patty Kambesis, Mark Minton, Bill Mixon, Dale Pate, Susie Raines, Terry Raines, Rich Rowher, Paul Smith, Peter Sprouse, Terri Sprouse, Nancy Weaver, and Alan Williams continued the exploration during the week of 12-19 October 1985. A rigging party entered, followed by two survey teams. The last drop landed in a large and complex chamber, the Blue Flowstone Room. Adjacent to it was an even larger room, the California Chamber, which was about 100 meters across. These two rooms, connected in at least four places, took four surveys to map completely. Another complex of rooms, the Shirt Pocket Room and Helictite City, extended off of the Blue Flowstone Room. This area was heavily decorated, notably with some clear soda straws almost a meter long.

Out of this whole complex, at the -300 meter level, were various pits leading down through breakdown. Sever-



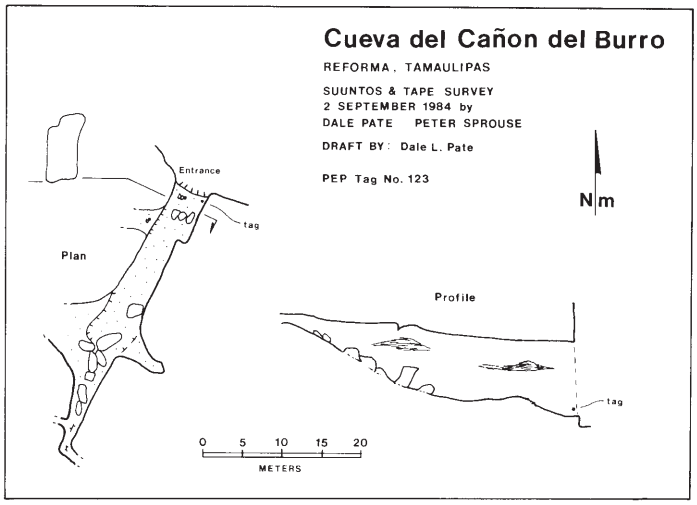
al of these united and got back into solid rock as they headed downward. Then the cave began a strong northwest trend in Cirolanid Canyon, and exploration ended at a drop 10-15 meters deep. Currently, Cueva de la Llorona is 2256 meters long and 398 meters deep.

LLORONA AREA CAVES

Numerous smaller caves were discovered near Cueva de la Llorona. To the east near the anticlinal breach four small caves and pits were found: Cueva la Bruja, Cueva la Brujita, Sótano Mas Alegre, and Sótano del Fin del Mundo. About 400 meters northeast of Llorona, two promising caves were located. Cueva de la Sangre was explored down several climbs and drops to a constriction at -50 meters. Only 100 meters to the east is another cave, Cueva Oscura, which was explored down a 20 meter drop to a second pit.

SOUTHERN CAVES

At the southern end of the Purificación karst area, exploration has been going on in Sótano de San Marcos, a complex cave 1019 meters long and 126 meters deep.(See separate article in this issue on San Marcos). Another cave explored in the southern part of the area was Cueva del Cañon del Burro at the mouth of the Arroyo Trejo, a major canyon that has its source near Cueva del Tecolote. The cave was checked on 2 September 1984 by Charles Fromén, Dale Pate, and Peter Sprouse. It is a bat cave about 50 meters in extent on the side of the arroyo.



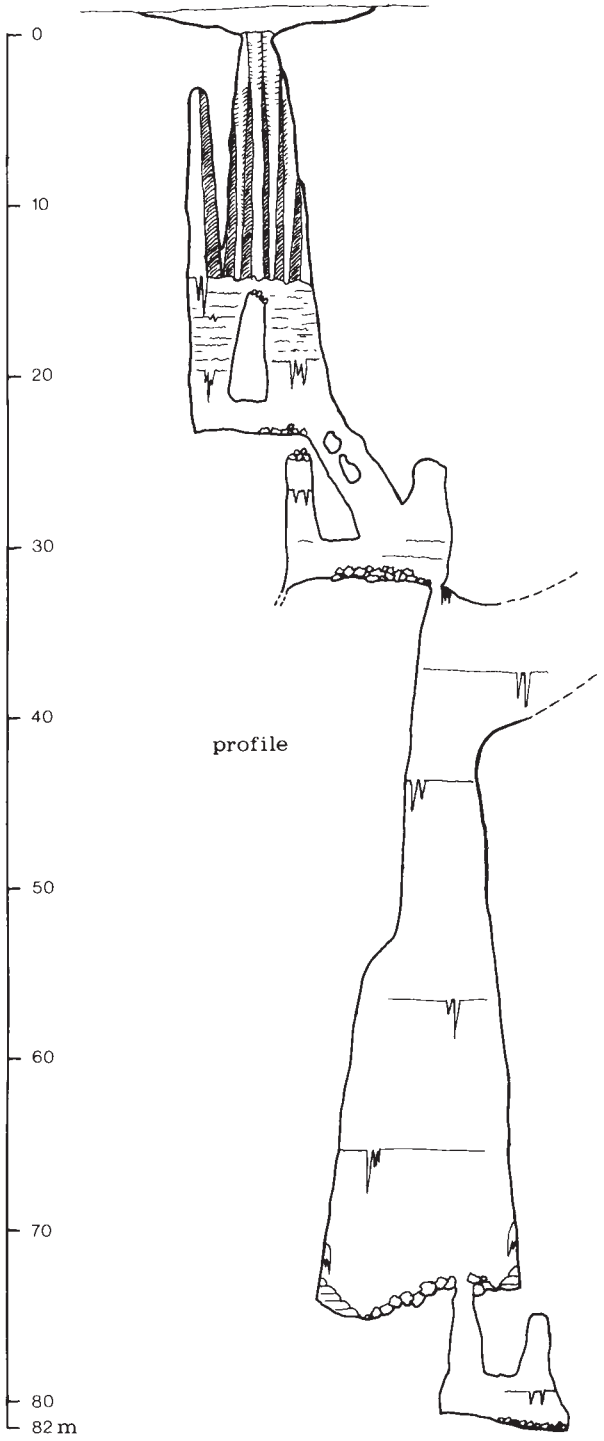
Near the village of Asunción, on the ridge south of Tecolote, a return trip was made to Cueva de Las Hoyas by Andrew Davison, Peter Sprouse, and Terri Sprouse. They explored to a pinch about 40 meters down. Between Asunción and El Molino along the eastern escarpment a short vertical fissure named Sótano del Redivisadero was checked.

Access to the Asunción area is from the east via Canon Peregrina, through which the Río San Felipe flows. Not far into the canyon on the south side is Cueva de los Murciélagos, a bat cave checked by Andrew Davison and Peter Sprouse on the same trip. Although the cave goes, they only mapped in for 50 meters before dust problems caused them to quit. Farther into the canyon they located another bat cave, this one on the north side, near where the limestone contacts the shales of an anticlinal core. This has a large entrance above the river, but soon narrows to a passage with a strong guano odor. It was not explored. There appears to be another shelter-like entrance across the river.

EL VIEJO

At the western edge of the Purificación area near Zaragoza, Nuevo León, cavers continued prospecting for pits on the eastern flank of Cerro el Viejo in early September 1984. Sótano del Primero de Septiembre, the third of three pits overlooking La Escondida that were found two months before, was explored by Paul Fambro and found to be a 116-meter drop. It had a flat floor with a small hole going down, as well as a large opening in the wall 10 meters off the floor.

At the north edge of La Escondida, they saw an entrance that took two arroyos, which they saved for a later trip. Farther north, a multi-drop cave

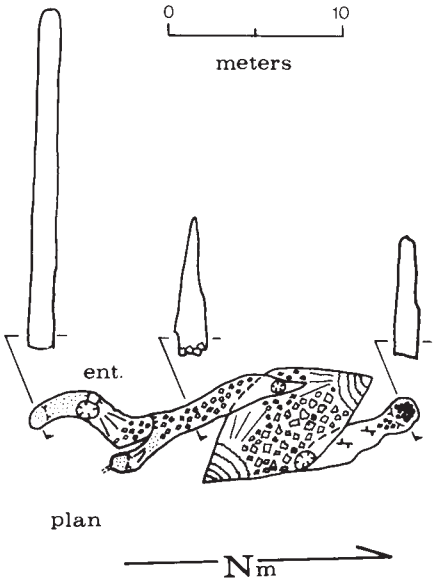


profile

POZO DE EL NINO

ZARAGOZA, NUEVO LEON

Surveyed 1 September 1984 by
J. Ackerman, D. Dodge, P. Fambro,
J. Feely, L. Thompson



PF/LT/PS

called Pozo de El Nino was explored. Jack Ackerman, David Dodge, Paul Fambro, Jim Feely, and Lynne Thompson surveyed the cave to its terminus at -82 meters. It contains drops of 15, 7, 8, 43, and 8 meters.

PROYECTO ESPELEOLOGICO PURIFICACION

The efforts of the project cavers described in this article resulted in the survey of over 11 kilometers of new passages in caves in the Purificación area. Now entering its tenth year as an organized project, the PEP continues to make great progress unravelling the underground secrets of the Sierra Madre. And with each survey shot, the caves of Purificación move closer to eventual unification into a system of enormous size.

Cerro El Viejo is the highest point in the Purificación karst. (Terri Sprouse)

PROYECTO ESPELEOLOGICO PURIFICACION

Numerosos viajes fueron hechos al área de Purificación durante 1984 y 1985. Dos expediciones fueron hechas al Sistema Purificación. Durante la primera, se instaló un campamento subterráneo de 5 dias a casi 3 kilómetros dentro de la caverna. Unos 3352 metros de pasajes fueron exploradas. El segundo viaje se sigieron pasajes accecibles en la parte superior y se exploraron 556 metros de estos. Purificación es ahora 55,078 metros de longitud. Al sudeste del sistema, nuevos esfuerzos fueron hechos en la Cueva del Tecolote, incrementando así su longitud a 7015 metros. La Cueva de la Llorona fué localizada y explorada en una longitud de 2256 metros y 398 en profundidad. Más al sur, el Sótano de San Marcos fué topografiado (1019 metros de largo y 126 metros de profundidad), así como la Cueva de Las Hoyas (50 metros de profundidad). Varios sótanos fueron explorados y topografiados en el lado oeste del área, cerca de Zaragoza, Nuevo León.

MAJOR CAVES OF THE PURIFICACION AREA

Compiled by Peter Sprouse

LONG CAVES

		meters
1.	Sistema Purificación	55,078
2.	Cueva del Tecolote	7,015
3.	Sótano de Las Calenturas	6,032
4.	Cueva de la Llorona	2,256
5.	Sótano de la Cuchilla	1,124
6.	Sótano de San Marcos	1,019
7.	Cueva del Borrego	657
8.	Cueva de los Allarines	265
9.	Cueva de California	250
10.	Cueva del Equinoccio	238

DEEP CAVES

1.	Sistema Purificación	895
2.	Cueva de la Llorona	398
3.	Cueva del Tecolote	231
4.	Sótano de la Cuchilla	172
5.	Sótano de la Rama	150
6.	Sótano de San Marcos	126
7.	Sótano de Las Calenturas	122
8.	Pozo del Primero de Septiembre	122
9.	Pozo Obscuro	111
10.	Pozo de Rancho Viejo	110

EXPLORATION

UNAM explores three caves

During the weekend of 25-27 June 1983, Josué Escobar, Andrea Raz-Guzman, Jorge Ortiz, and Ricardo Salas, from the Universidad Nacional Autonoma de México, explored the area around the villages of Cieneguilla, La Laguna, and Manzanilla, in the Municipio de Cardonal, Hidalgo. The area is a karst plateau surrounded by stream canyons. The climate, though wetter in the past, is now quite dry. The object of the trip was to evaluate the speleological potential of the area. This area was previously unexplored, and was selected after scrutiny of geologic and topographic maps.

A total of 14 caves were found on that trip. Most of them were vertical and ranged in depth from 5 to 100 meters. Six of these had been blocked by the locals so that cattle wouldn't fall in. It should be mentioned that we had a bit of trouble with the villagers the first night we camped. It turned out that they had recently been assaulted by outsiders, and so were suspicious of strangers. This being our first outing without our instructors, we had overlooked taking a letter of introduction, and had not made the acquaintance of the village heads. This was a lesson we shall not forget.

SOTANO DEL PERRO VIVO

We returned on the weekend of 11-13 November 1983 with Raul Sanchez and Eduardo Martinez, one of our

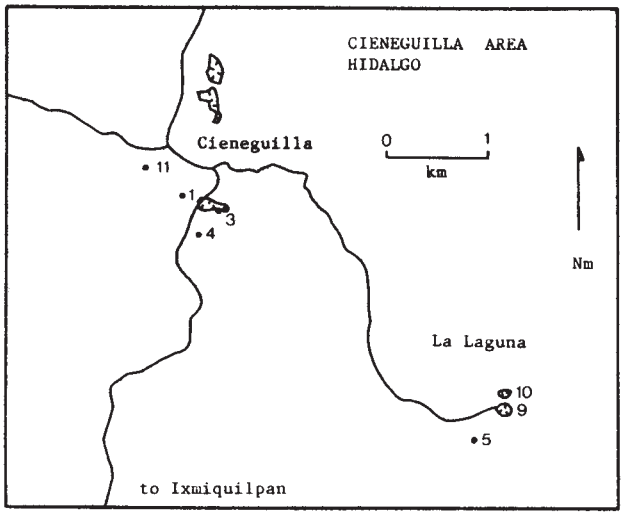
IN HIDALGO

in the valley of Cieneguilla

by Andrea Raz-Guzman MacBeth

instructors, and presented ourselves to the judge. We then went directly to pit number 10, the deepest we had found in June. After obtaining permission from the landowner, we entered the pit at noon. Below the first two pitches, at a depth of 60 meters, we found a dog. It was big, bone thin, unhurt, and scared, for we had knocked down all the rubble on a slope before we descended. We gave the dog some bread and continued. At 7 pm our electric lamps were getting low, and we ran out of rope at an estimated depth of 200 meters. We returned to where we had found the dog, and since it was then 10 pm, we decided to remain there until daylight. We had a sleepless night, for we hadn't expected to go so deep and were unprepared either with food or clothing for such a long trip. At 4 am we got up, and had to do some calisthenics to warm up and get moving. We packed the dog into a backpack, hauled it up using a 3:1 pulley rescue system, and were all out by 9 am. We left the dog with some villagers who told us that it had fallen into the cave two months before. It seems that it survived by gnawing bones of other animals that had fallen in, snapping at flies in mid-air, and drinking infiltration water. After news got around about the rescue, people became friendlier and we began to feel more at home.

A third group returned in December 1983 with Guillermo Mora, our head

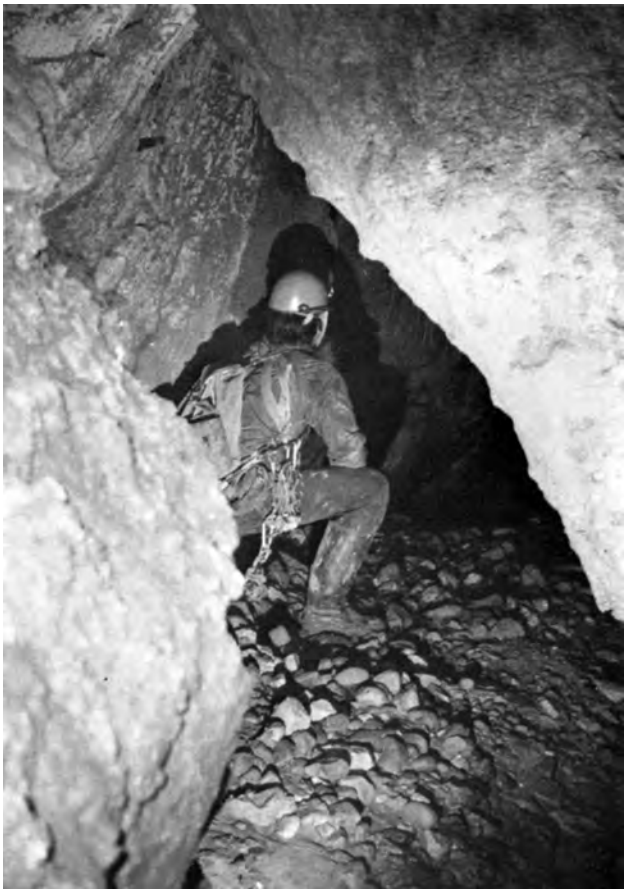


instructor, and mapped Sótano de Perro Vivo down to 350 meters. Unfortunately, the notebook was lost, so we have only a sketch. Most of the caves are vertical, and some promise to be quite deep. The villagers believe that one of the caves extends approximately 500 meters lower down into one of the nearby rivers. This is something that we plan to investigate.

MORE CAVES

As we were occupied in Veracruz during the first months of 1984, and then had a very heavy rainy season, we did not renew our exploration of the area until December 1984. This time, we explored three more caves and a pit with Ernesto France and Jaime Gonzales. Cueva No. 1 was a fissure 50 meters deep, Cueva No. 3 was a river cave about 60 meters deep that ended in a sump, and Cueva No. 11 was 90 meters deep. This last one was the most attractive of all, as it was formed in almost vertical reef-rock strata full of fossils. Strands of white fungi were noticed in this cave, and three months later Ernesto came down with histoplasmosis. He has since recovered. At Laguna, a 30-meter pit, Sótano No. 5, was found. It was full of ants and very muddy.

Jaime González ascending 30-meter pit in Fossil Reef Cave.

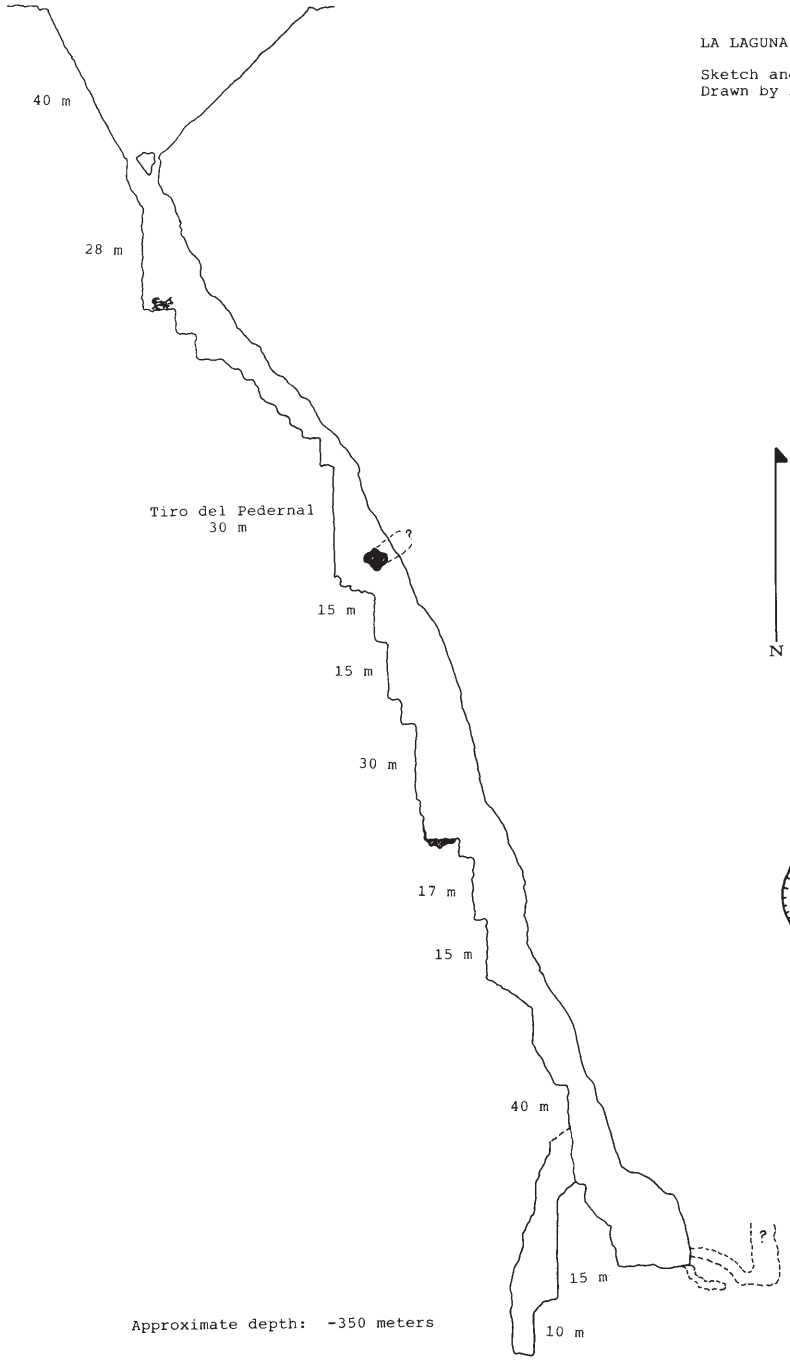


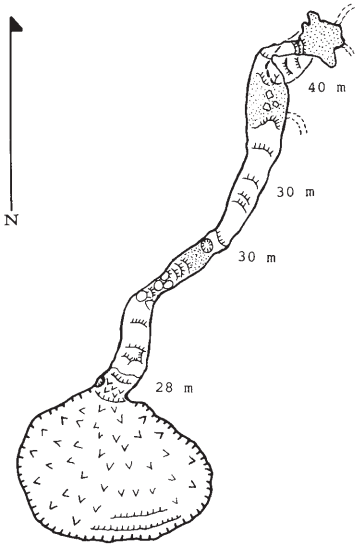
Ernesto Franco in Fossil Reef Cave.

SOTANO DEL PERRO VIVO

LA LAGUNA, HIDALGO, MEXICO

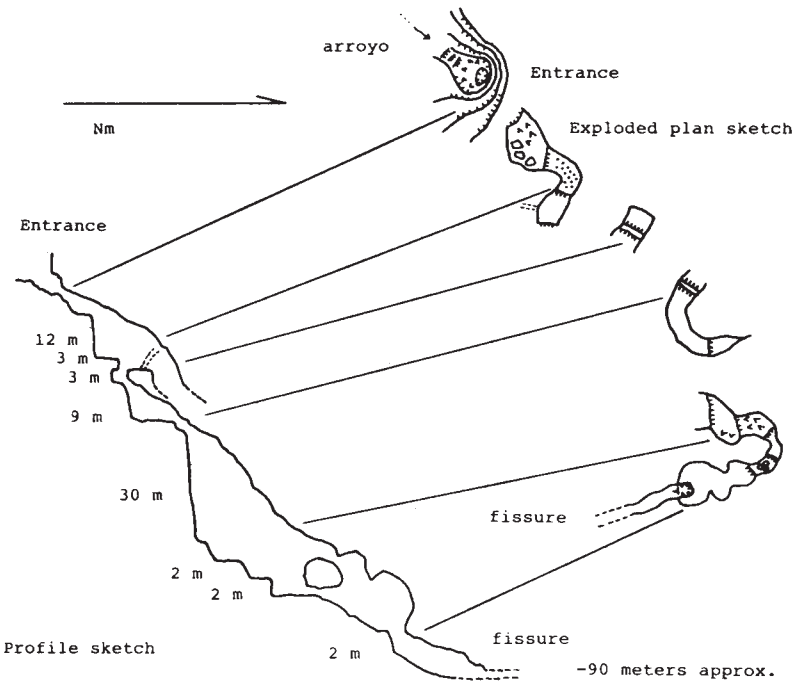
Sketch and compass map
Drawn by Andrea Raz-Guzman





Approximate depth: -350 meters

LT/TTS



CUEVA NO. 11 (Fossil Reef Cave)

CIENEGUILLAS, HIDALGO

Sketch by Andrea Raz-Guzman
21 December 1984

approximate horizontal
length: 50 meters

CARDONAL

Tres viajes fueron hechos en 1983 a un área en el municipio de Cardonal, Hidalgo. Catorce cuevas fueron encontradas, siendo la mayoría de tipo vertical y promedian una profundidad de entre 5 a 10 metros. La más profunda, el Sótano del Perro Vivo, fue topografiada hasta una profundidad de 350 metros (desafortunadamente el cuaderno de notas fue extraviado, y solo existe un croquis). Durante el primer viaje al sótano, los espeleólogos encontraron vivo, pero muy flaco, a un perro. Ellos le dieron algo de pan y continuaron su exploración. En su regreso, antes de salir del sótano, rescataron al perro, colocandolo en una mochila y jalándolo hacia afuera por medio de poleas. Ellos supieron después por medio de los habitantes del lugar que el perro habia caído de aquel hoyo hacia dos meses.

En 1984 cuatro cuevas más fueron exploradas. La Cueva No. 1 fué una fisura de 50 metros de profundidad. La Cueva No. 3 fué una Cueva río con 60 metros de profundidad, y termina en un sifón. La Cueva No. 11 fué de 90 metros de profundidad. El Sótano No. 5 fué de 30 metros de profundidad.

DIRECTORY OF MEXICAN CAVING GROUPS

compiled by Peter Sprouse

This directory has been compiled with the goal of furthering cooperation between groups caving in México, both foreign and domestic. Since this is the first time this has been done, there are likely to be errors or omissions. Corrections will be welcomed and will be used in future directories. Asterisks (*) denote groups that may be inactive.

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Tel. 5-48-3035

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Angel Soto Porrua
Av. Presa Don Martín 21
Col. Irrigación 11500
México, D.F.

*Asociación Mexicana de Espeleología
Eleonor Ledesma
Zaragoza No. 20
Col. Buenavista
México 3, D.F.

Club Alpino Espeleológico Tres de Monterrey
Claude Bachr
Local 26, Plaza del Bosque
Vasconcelos 202
Garza Garcia, Nuevo León
Meetings at above address every Friday 2 p.m.

*Club Potosino de Montañismo y Espeleología
Benjamin Oliva
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José Luis Beteta
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Grupo Expedicionario XAMAN-EK
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Huautla Connection

LA GRIETA AND SAN AGUSTIN LINK UP

by Mark Minton

Forty meters. That had been the gap separating two of México's deepest caves for the past six years. A small but formidable distance it was, resisting all efforts at human passage in spite of numerous attempts by different groups. For an area with such an incredible density of long and deep caves, major connections in Huautla have never been plentiful or easy. Ever since its discovery in 1980, Nita Nanta has been the object of intense effort for a connection with nearby Li Nita. Now, in the quest for that connection, Sótano de San Agustín and La Grieta have finally been joined together.

Nita Nanta has been an enigma since the first days of exploration. The original entrance lay only 1 kilometer to the northwest of and 100 meters above Li Nita. It should have been an easy connection. But the cave seemed to have a mind of its own, leading us back year after year, growing ever deeper, longer, and more complex, coming tantalizingly close, only to turn away. In 1985 we were sure we'd hit it big. If the connection was possible, we'd get it. After all, the leads were there and we had all the tools of the trade: equipment for climbing, digging, and diving. And, it seemed as if the proximity and the geology were on our side.

On Sunday, March 31, we rolled into Huautla thirteen strong but two weeks late, due to delays in getting the Mexican government's permission now required to cave there. Two more of our group had already arrived and had taken up with the Australians who had been in the area for several weeks. (See item in México News.) Three houses were secured, two for sleeping quarters and one as a kitchen and general storehouse. By Tuesday we were getting underground in full force. Jeb Blakeley, Bret Blosser, and Ed Holladay headed into the Zan entrance of Nanta to deploy the rigging and carry supplies to Camp II in the Football Stadium. Pam Duncan, Nancy Weaver, Jim Youmans, and I entered Li Nita to survey some high-level leads off the Carwash area. Frank Bogle, Keith Goggin, Richard Schreiber, Ron Simmons, Jim Smith, Lisa Wilk, Paul Wojtkowski, and new arrivals Dave Black, Marion Smith, and Bill Steele rigged San Agustín down to its Camp II. An advantage of such a large group is the ability to carry on exploration simultaneously on several fronts.

Opposite: Jeb Blakeley on a very wet pitch in the lower San Agustín Gorge. (Jim Smith)

NITA NANTA

When we last visited Nita Nanta in 1983, the deepest part of the cave was left unsurveyed due to high water (AMCS Activities Newsletter No. 14). Thus the first order of business for the camp crew of Bill, Ed, Jeb, Jim S., Marion, Richard, Ron, and Scott was to finish mapping at the bottom. They broke into two groups and spent ten hours surveying through the tortuous breakdown that fills the large base-level streamway. At the end they met with disappointment. Where previously a narrow squeeze through the boulders had given access to a large, deep sump, now the rocks had shifted and that last chamber was inaccessible. High and low there was only mud-covered breakdown. The stream just went under a ledge and sank into the sand and gravel. Gone, then, was the prospect of a scuba dive at this remote site.

Back at camp after a 21-hour trip, data reduction confirmed our suspicions. Nanta, now 1080 meters deep, was headed into the same breakdown-crunch zone that terminated Agua de Carrizo, La Grieta, and San Agustín within a stone's throw of one another. One hope remained: that a high-level route over the collapse could be found. On the next trip, all of the PMI was pulled from the Gorge and taken to the undescended pit discovered last year at the end of the passage across the Corkscrew Shaft, last of

Jim Smith at the bottom of the 180 with camp duffle, Sótano de San Agustin. (Keith Goggin)

the Rat-Tail File Series. This passage had been heading toward Carrizo, but now went virtually straight down and angled back in the desired direction. After seven drops the rope ran out. With a stream and good wind, there was still hope!

While the camp was in progress in Nanta, more upper-level work was done in Li Nita and Nita Cha. The latter was almost as high as Nanta and had not been entered since 1980. A large group of people, determined to make it go, carried 500 meters of rope to the remote entrance. It ended two drops beyond the end of the 1980 survey. Then on April 7, a group of nine headed into San Agustín to check the breakdown in Loggerhead Hall, the other side of the probable connection site with Nanta. If our timing had been right, we might have even established a sound connection with the Nanta crew. It turned out to be more of a trip than we were prepared for, so half way along Kinepak Kanyon (-615 meters) we dropped our digging equipment and headed out. This was clearly a lead to be done from camp, not the surface.

FLOOD!

As fate would have it, turning back was a wise move. In fact, we should have left sooner. It had been raining steadily topside, and by the time most of the group reached the entrance, the cave streams had turned brown and begun to swell. Frank and Lisa were out first, followed by Dave, Mark, Nancy, and Paul just after dawn. But by midday Bret, Jim Y., and Keith still hadn't returned. The rain finally let up in the afternoon, so at 5:30 Frank and Paul went back in. There was an ominous waterfall pouring down the normally dry 90-meter entrance shaft. They soon found the missing cavers huddled together on a high ledge just above Camp I, waiting out the flood pulse. Normally dry crawls had been half full of water, and their next climb had been a swirling vortex devoid of airspace. Fortunately no one had been caught in the much wetter and more technical Fishure just below Camp I. Including their nine-hour wait, the last three finally emerged 30 hours after they had entered, tired but unharmed. It then proceeded to rain all night.

The high water was also being felt by the camp crew in Nanta. Camp II is high on one end of the Football Stadium, well away from the 65-meter Maelstrom that thunders into the center of the room. Yet now a swirling mist pervaded even there, covering clothes, sleeping bags, and cavers with a film of moisture. So great was the force of water from above that rather than landing in its customary spot on the floor, the falls arced across the void and crashed into the far wall. Again we were fortunate that no one had been in the lower,

even wetter sections of the cave. The water was still very high a day later as the campers exited. "It was pretty close to the real thing," Jeb said of the water in the 86-meter Flaky Shaft just above camp. "If it were any closer to the real thing I'm not sure I'd enjoy it!" He was refering to our standard joke that everything we do, no matter how difficult, is merely practice for the "real thing." Some of the ropes were abraded, but everyone made it out okay.

During the next week Bill and Janet Steele, Dave, Marion, Pam, Ron, and Scott left for the States, and Andy Grubbs arrived. Considerable surface checking was done, and several interesting leads were uncovered. One of the young men from the village of San Agustín, Jaime Escudero, wanted to go caving, so Ed, Jeb, and Keith took him down the three drops in Deer Cave. He did very well, and expressed a desire to visit Sótano de San Agustín next year. Meanwhile, Jim Y., Keith, and I mapped the Rat's Nest Passage, a high side-lead in Li Nita known since 1980. To our amazement we surveyed to a point five meters higher than the entrance, thus adding a small but significant amount to the depth of Sistema Huautla, enough to move it ahead of France's Gouffre Berger and into the number five spot worldwide, at 1252 meters deep.

DAY TRIP

Weary of duffle hauling, the Nanta crew decided to return to the pit lead beyond the Corkscrew Shaft on a "day" trip from the surface. This was an ambitious plan indeed, certain to be a trip approaching the "real thing." It would be over fifty drops, 840 meters vertically, one way, plus whatever new was found. The crew consisted of Ed, Frank, Jeb, Jim S., Keith, Paul, and Richard. They were at the lead 11 hours after entering, and it was grim. The passage was a narrow rift, requiring hammering and digging to get through. Jim moved ahead of the survey and finally came

Bill Steele with camp duffle on first drop in Nita Zan. (Ron Simmons)

to a rope drop into large passage, but he had no rope. Then on the far wall he spotted one of the distinctive bull's-eye survey stations used in the upstream Confluence Passage at -1015 meters. They had connected all right -- back into lower Nanta! When this news reached the others, the survey was aborted, and the raptured crew headed for home, derigging the new section as they went. The last caver was out after nearly 39 hours, a Huautla record.

Hundreds of meters above the bottom crew, Andy, Jim Y., Lisa, Nancy, and I were scaling waterfalls following a major infeeder that intersects Zan at -100 meters. After six pitches, our rope ran out at yet another upclimb. Because of all the surface debris and a stiff breeze, we felt sure we would hit the surface soon. Three days later we were back

with more rope. After climbing steeply, the passage leveled out and became mazy. We did a little reconnaissance and shortly we were looking out a sinkhole into daylight. Andy and Jim descended and pulled up all the ropes on the new route, while Nancy and I finished the survey and did an overland tie-in to close the loop on Nanta's ninth entrance, Nita Lata. This marked the first time a significant entrance in Huautla had been found from the inside.

CONNECTION

With all of the obvious leads on the Nanta side exhausted, the search for the connection was turned toward Sótano de San Agustín. On April 21, Andy, Ed, Jeb, Jim S., Keith, and Paul headed in with plans to establish Camp IV at the end of Kinepak Kanyon. Frank and Richard also hauled a duffle apiece to help the overloaded campers. Camp IIA looked awfully good by the time they arrived, and since they also wanted to see other parts of the cave more easily accessible from there, the Camp IV idea was abandoned.

The next day the camp crew was in Loggerhead Hall probing the ubiquitous breakdown. Following the best draft, Jim and Paul dug into a short section of the open Scimitar Passage, but it quickly ended in terminal-looking breakdown. Jim let out a hoot, and received a resounding echo! With renewed vigor they dug open a small hole and looked out into big passage. A charge was set off on a large boulder, then they retreated to camp to let the breakdown stabilize. After a rest day, the camp crew, recently joined by Lisa, set out to clear the rubble and see what they'd found. Jim immediately recognized where he was: not in Nita Nanta, but the Fracture of the Deep in La Grieta! On April 24, 1985, cavers were triumphantly running down passages not seen since the first days of 1978. Amazingly, there were still survey stations to be found, so a direct tie-in was easily accomplished. The gap had been bridged; La Grieta and San Agustín were one. The junction was named Petty Connection in honor of O. Scott Petty, an Explorers Club benefactor to the expedition.

The La Grieta - San Agustin connection site and crew. (Keith Goggin)

But what of our main goal -- Nita Nanta? The connection of La Grieta added nearly 9 kilometers to Sistema Huautla, but no depth. We needed Nanta for that, not to mention the 11-plus kilometers of additional length it would add. So back into the breakdown they went, on both sides of the connection area. More digging, climbing, poking. A few loops were found coming out into known cave, but nothing crossed the remaining gaps to Carrizo or Nanta. After a week underground, the campers returned to the surface to dry out and restock.

Three days later, Camp IIA was active again. After another disappointing day of breakdown pushing and lead climbing, the camp crew was ready for some fun. They went on a grand tour of lower San Agustín, all the way to the sump. A side trip to photograph the spectacular Anthodite Hall was also included.

One final trip to Loggerhead Hall was again without success. It was time to face the reality that Nita Nanta was still its own cave. They had done their job well; there was nothing reasonable left to push. There was also one hell of a lot of derigging to be done, so the arduous task was begun. People carried loads from

deeper in the cave up to Camp I, then returned to Camp IIA for the night. Finally camp packs, cavers, and all the ropes from the Fishure were at Camp I, from where they were retrieved on various trips from the surface.

NIDO-NTAU

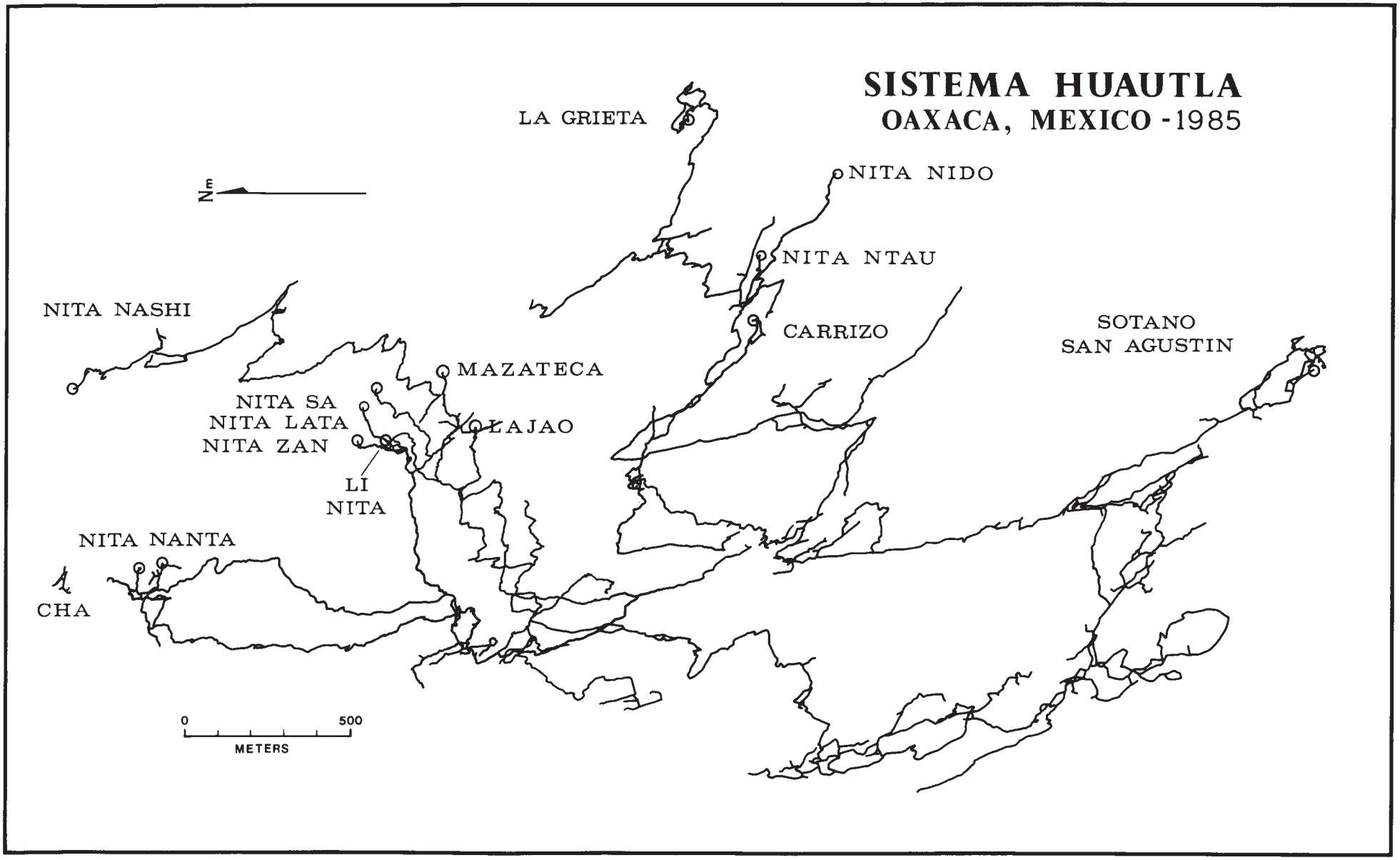
While the connection effort was underway in San Agustín, the surface crew was pursuing a lead Frank had found near Carrizo. The entrance to Nita Nido is an unlikely looking hole at the base of a cornfield in a steep sink, but it opens quickly into comfortably sized passage sloping downward. Further on, the passage narrows to an awkward squeeze for several meters, then opens out again at a pit. A few more drops bring one to the edge of a yawning chasm. The TAG Shaft was rigged as a stair-stepping series of pitches over 100 meters deep into a sizable room. Unfortunately, further progress was not possible, since both streams disappeared, one into a narrow slot and the other into gravel. Strangely, the airflow, so noticeable above, had also vanished.

Ed Holladay on the first drop in the San Agustin Gorge. (Keith Goggin)

On the other side of a small ridge, we found another drafting lead and so moved the tackle from Nido over to it. Nita Ntau (Wind Cave) went down very rapidly in nice-sized passage with a small stream and a gale of wind. On the first trip we ran out of rope after seven drops. On the next push we broke into two parties to survey and rig ahead. The riggers found large passage dropping fast. Again they ran out of rope, this time at the top of a truly impressive shaft 20 meters high and wide, and estimated to be over 100 meters deep. Since that team was all from the Southeast, they wanted to revoke their previous use of the name TAG Shaft in Nido and use it here instead. A better trophy, they thought. Back at the field house, data reduction ended the need for further discussion and naming protocol; the lead in Ntau was poised directly over Nita Nido's final chamber. Indeed, we returned to descend a fine, wet, and nearly free 133-meter shaft smack into the bottom of Nido. The drops in Nido and Ntau were collectively called the TAG Shafts. The cave had met a timely end, as it was the first week of May and time to head for home.

EPILOGUE

The 1985 Nita Nanta Expedition realized a long sought connection: La Grieta and Sótano de San Agustín. The total length for Sistema Huautla (Li Nita, La Grieta, and Sótano de San Agustín) is now 33,789 meters; the depth is 1252 meters. In spite of tremendous effort, Nita Nanta remains unconnected at 11,655 meters long and 1080 meters deep. Our inability to forge a connection is now doubly enigmatic. The upper parts of Nita Nanta come within 3 meters of Li Nita, while


SISTEMA HUAUTLA
OAXACA, MEXICO - 1985
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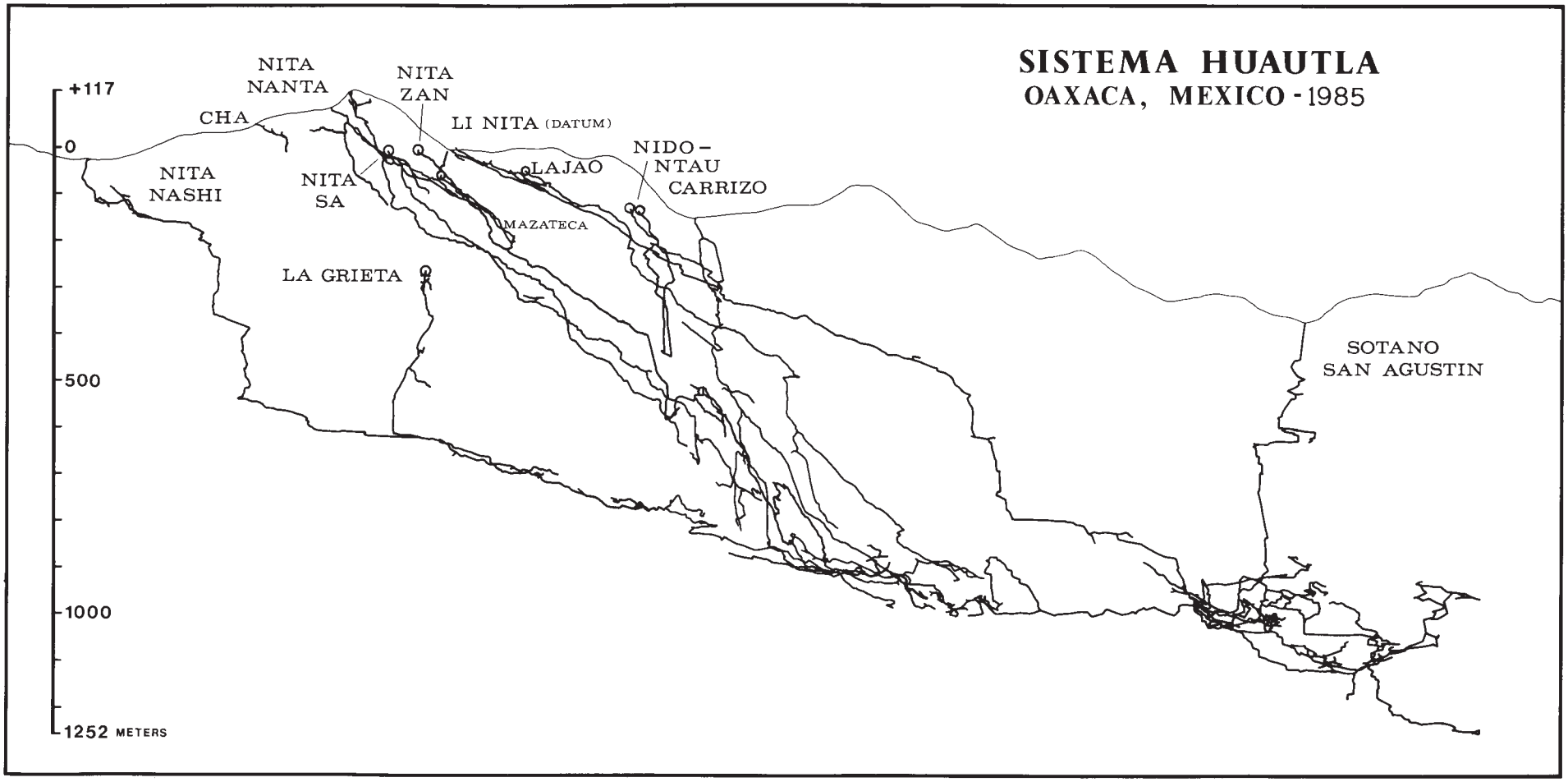
SISTEMA HUAUTLA
OAXACA, MEXICO - 1985
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LI NITA (DATUM)
NIDO-NTAU
LAJAO
CARRIZO
NITA NASHI
NITA SA
MAZATECA
LA GRIETA
SOTANO SAN AGUSTIN

the lowest section of the cave is only 44 meters from La Grieta. A breakthrough either place would produce a system 1370 meters deep and over 45 kilometers long. Sótano de Agua de Carrizo may well play a pivotal role, as it is poised directly between Nita Nanta and La Grieta. If Carrizo were to join in the anticipated connection too, an astounding quadruple connection of four caves, each over 750 meters deep, would be the result.

Less than the usual amount of new passage was discovered in 1985. This was largely because so much time was spent in search of connections. New cave continues to be found, and as the TAG Shafts show, some of it can be spectacular.

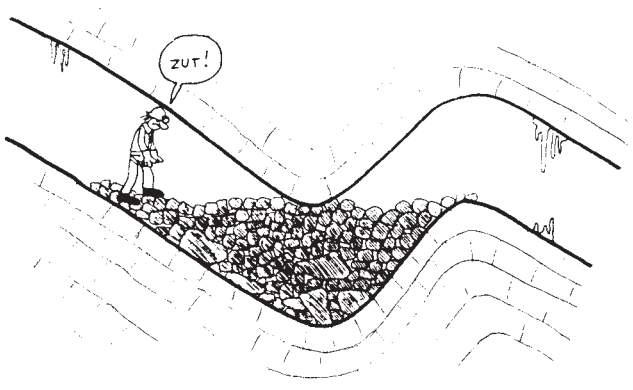
The expedition is indebted to the more than twenty sponsors who generously supplied money and equipment. Contributing, as they have for many years, were Bob & Bob, The Explorers Club, Oregon Freeze Dry Foods, and PMI. Major contributions were also made by Celebrity Foods, Duofold, ITT Phillips, Koehler, Miss Molly Foods, Petzl, Sylvania, Thermarest, and Wells-Lamont. Further thanks are due to Srs. Hilario Juárez and Gilberto Salinas of the Dirección General de Geografia for expediting our federal permission to cave in Huautla.

EXPEDICION HUAUTLA 1985

El objetivo principal de la expedición Huautla 1985 era el de conectar Nita Nanta con el Sistema Huautla. El Campamento II fué instalado en Nita Nanta, pero los espeleólogos no lograron encontrar una ruta hacia el sistema, a pesar de que estaban muy cerca del Sótano de San Agustín. Decidieron establecer ahí un campamento para buscar la ruta que conectara al sistema, pero ahora desde ese lado. En lugar de conectar con Nita Nanta, ellos hicieron una conección con La Grieta. Aún con esperanzas de encontrar una conección con Nita Nanta hacia el sistema, se volvieron a instalar campamentos en Nita Nanta y Sótano de San Agustín, pero nuevamente no se logró conección alguna.

Otras dos cuevas fueron descubiertas y conectadas, Nita Nido and Nita Ntau. Ambas tienen tiros de más de cien metros de profundidad, e intersectan un gran salón en la parte más baja.

Se topografió un nivel superior en Li Nita que incrementó la profundidad total del Sistema Huautla lo suficiente para colocarlo en el quinto lugar en el mundo con una profundidad de 1252 metros. La longitud del sistema es actualmente de 33,789 metros. Nita Nanta tiene 11,655 metros de largo y 1080 metros de profundidad. Si Nanta pudiera ser conectada en el sistema, se lograría una profundidad de 1370 metros y más de 45 kilómetros de longitud.



Speleo Flash

Ode to Nanta

by Bill Steele

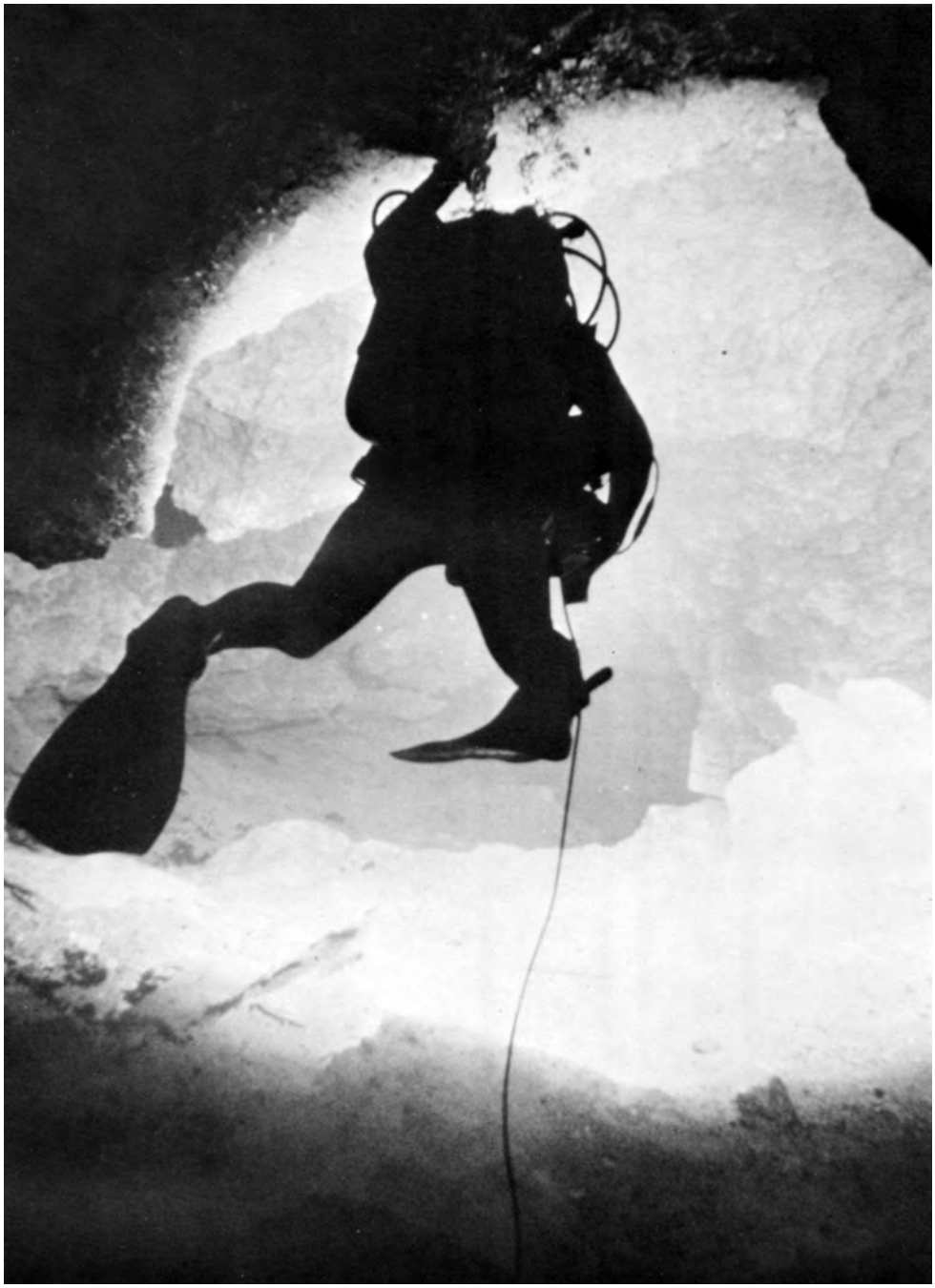
Oh there's a cave many times deep,
Where cavers spend nights of no sleep,
Nanta goes down so far and tight,
And makes a caver exert their might,
Ah, yes I've been there,
And I'll tell you this,
There was fun to be had,
In that dark and mist.

Some wanted an end to say that's all,
The entrance and sun would often call,
It did end once but look again,
Naranja descended like a parting friend,
To a stadium room with a whispering falls,
Kaliman's climb up a wall so tall,
A fossil route that Richard sniffed,
This was not caving to miss.

I'm camping now this spot's fifth time,
With seven caving friends of mine,
I missed a trip with a rock hurt arm,
But it's healed now without great harm,
I'll sleep once more then tomorrow down,
A rugged route into solid ground,
We'll search for a way to connect,
For that is the quest of the Huautla Project.

Camping Beyond Sumps

by Bill Stone



Bill Stone

Underground camps have been used routinely in Mexican caving for nearly a decade now. Since the article "Underground Camps for Deep Caves" appeared in AMCS Activities Newsletter No. 8, substantial and continuing refinements have been made to equipment and techniques for extending the endurance radius. Wool clothing has been replaced with lightweight, water-repellent polypropylene, and the use of heavy canned foods has been abandoned in favor of freeze-dried or "retort processed" foil pack meals, to name but a few of the changes. An article in the August 1985 NSS News by Mike Fischesser describes a system where the weight of a 5-day camp kit for dry, horizontal caves has been honed to 22 pounds.

During the past year, expeditions to Cueva de la Peña Colorada in México and to Wookey Hole in Great Britain have succeeded, for the first time, in setting long-duration camps beyond a series of sumps. In both locations approximately 500 meters of diving was required prior to reaching the camp. The techniques developed for these two projects will be of interest primarily to cave divers. However, since compactness and weight were critical in the selection and design of equipment, some of the methods will also be of interest to expedition cavers wishing to optimize their camping kit.

EQUIPMENT OF CHOICE

The goal in manifesting equipment bound for a camp beyond a sump is to make the density of the pack as close as possible to that of water. Anything less dense requires lead ballast to be included in your logistics. Bulky, lightweight items should thus be avoided. Two items traditionally used for underground camps unfortunately fall into that category: synthetic sleeping bags, and freeze-dried food -- particularly the new nitrogen-packed variety. Regarding the former, a novel solution was developed for the Wookey Hole project. Snug-fitting mummy-type sleeping bags were custom fabricated from one centimeter layers of Thinsulate backed on both sides with lightweight rip-stop nylon. When tightly rolled, these compressed to an 8-inch (20-centimeter) by 7-inch (17-centimeter) cylinder weighing slightly over a pound. These were more than sufficient for the 3-degree Celsius temperature encountered in Chamber 24 in Wookey Hole. Future designs for México will employ a 0.5 centimeter thickness of Thinsulate with the result of halving the weight and volume. Both materials are available in bulk from REI. Foam sleeping pads were not used on either expedition. We slept on wetsuits covered with plastic garbage bags or, in the case of Camp II at the Peña Colorada, in lightweight nylon Yucatán hammocks.

For food, the philosophy adopted on both expeditions was to maximize the amount of high-carbohydrate powders taken, and supplement them with compact prepared meals for taste. A liter Nalgene bottle filled with finely powdered potatoes (not flakes) has an energy value of 8000 calories and is actually negative in water, which means it can be used to offset other less dense items in the same bag. Nalgene bottles, incidentally, proved to be waterproof to at least 25 meters, and hence were used for all dry powders. The energy content of these provisions can be further increased by carrying liquid margarine, which has the highest calorie per gram value (10) of any food. This also packs well underwater, being nearly neutral. The prepared meals consisted of compressed freeze-dried disks and the new retort-processed foil-pack meals. The compressed meals transported well underwater but, unfortunately, have now been discontinued by Oregon Freeze Dry Foods. The foil-packed meals, on the other hand, are not only compact and waterproof, but they are also neutrally buoyant, which means no additional lead. They also have the advantage of being immediately edible, hot or cold. The foil pack can be

used as a bowl, if you are tight on space. At this time, the only manufacturer of foil pack meals in the U.S. is the Yurika Company, Birmingham, Michigan.

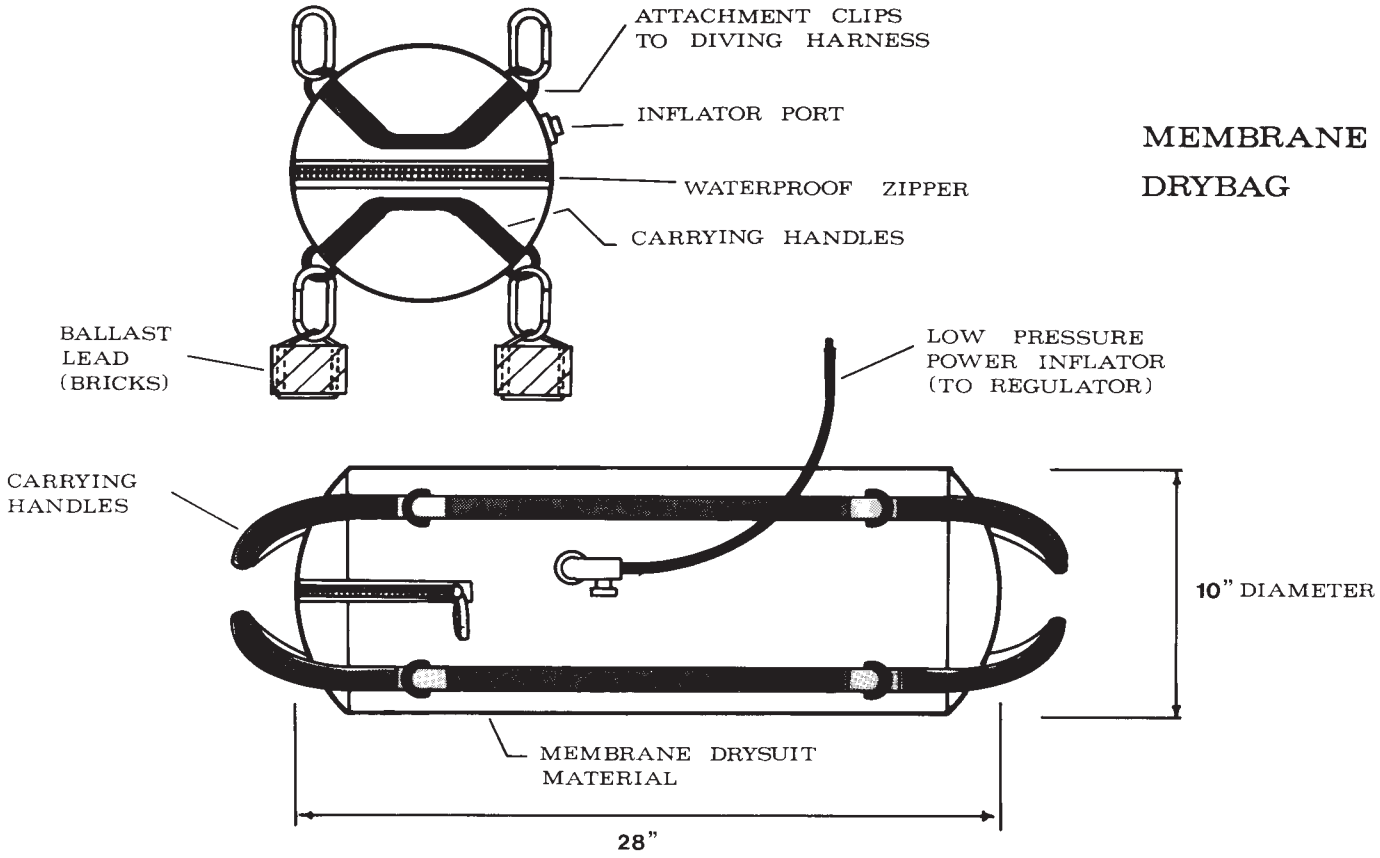
UNDERWATER TRANSPORT

There are two types of cargo going to a camp beyond a sump: wet loads and dry loads. Dry loads include items such a polypropylene clothing, sleeping bags, and surveying equipment that require special containers to keep water out. Wet loads include Nalgene food bottles, foil packed meals, gallon narrow-mouth Nalgene bottles filled with carbide (we proof-tested these to 25 meters), aluminum fuel bottles (be sure they are full, otherwise they will crush), and other bulk hardware that does not have to stay dry. Most one-piece stoves can be packed "wet" provided they are filled prior to diving. Lightweight stoves, such as the MSR, will need to be packed dry since even a small amount of water in the gas feed line can render the unit inoperable. Wet loads can be handled in a standard day-trip tackle bag for short trips, or in expedition-size ballistics nylon duffels when establishing a long duration camp. The more items you can put in this category, the better off you will be, since dry loads invariably require lead ballast, which equates to dead weight.

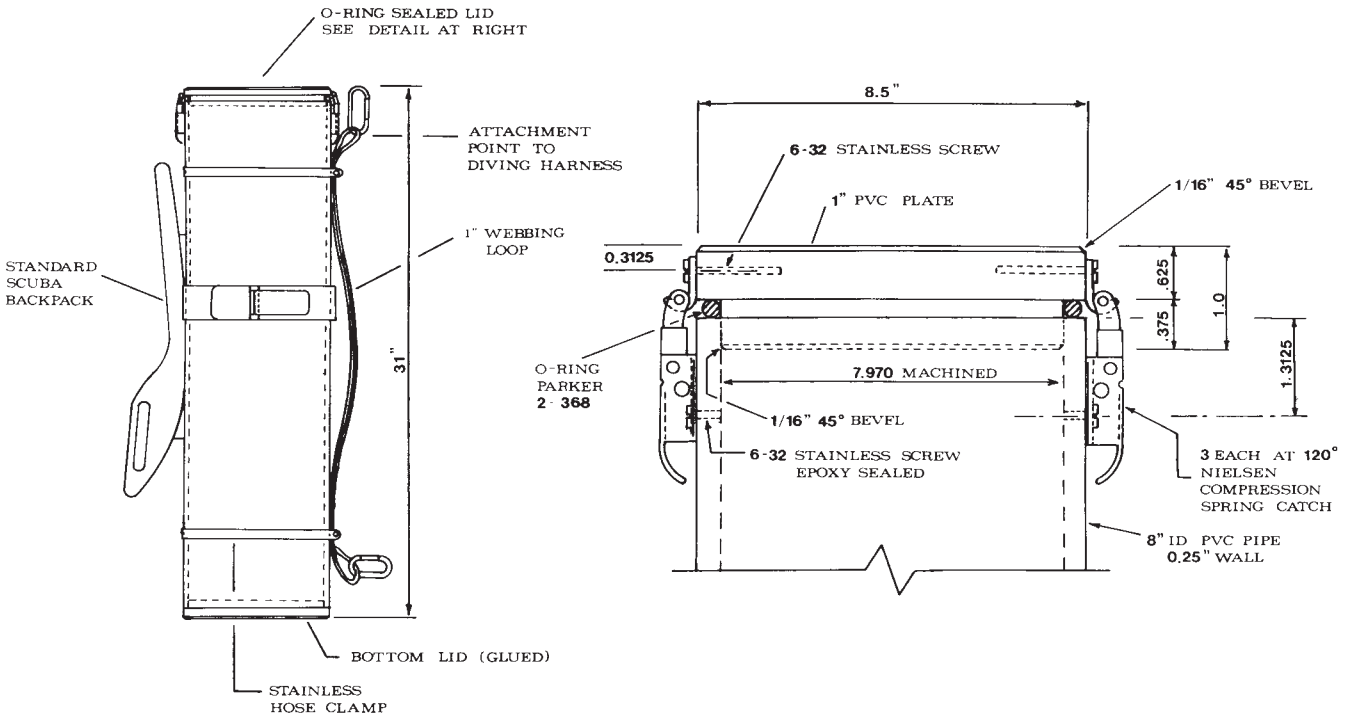
We developed two systems for transporting dry loads. The first, pictured in Figure 1, employs a non-rigid design based on membrane dry-suit technology. The "drybags" are roughly two-thirds the size of a standard backpack duffel and were specially manufactured by the Viking Technical Rubber Company. One end of the bag has a waterproof zipper, the heart of the system and also the greatest cause for distress. The zippers must remain free of grit and mud to seal, a requirement often difficult to meet in sump diving operations. The bags measured 10 inches (25 centimeters) in diameter by 28 inches (75 centimeters) high, and typically required 75 pounds of lead to sink. Unless positive actions are taken to maintain volume, the bag will crush as one descends into an underwater tunnel. This can be counteracted by installing a power inflator on the bag and running it off a low pressure regulator port, the same as for a normal buoyancy compensator. Attachment points on the top of the bag permit it to be slung from shoulder and waist D-rings on a diving harness. The chief advantages of the drybag are that it is lightweight, has a high volume, and can be rolled up and packed for transport between sumps. However, in our experiences, they never stayed perfectly dry -- either from minor grit in the zipper or errors in fabrication -- and we usually had to pack important items inside additional plastic bags prior to loading the dry bag.

By common agreement, the best dry-system used a rigid, thick-walled PVC pipe section equipped with pressure-proof end caps sealed with o-rings. These were constructed from 31-inch (80-centimeter) lengths of 8-inch (20-centimeter) inside diameter pipe with a wall thickness of .25-inch (6.5 millimeters), as shown in Figure 2. The end plates were machined from 1-inch (25 millimeter) PVC plate. The bottom plate was permanently glued, while the top plate was equipped with an o-ring seal and a series of three Nielsen spring catches to lock it down prior to diving.

This particular design was rugged, relatively insensitive to mud and grit -- you just washed the lid and o-ring off prior to diving -- and required no special buoyancy adjusting mechanisms. They required between 25 and 30 pounds of lead ballast. Once neutral in the water, no further attention was necessary. Divers were easily able to handle two of these through a flooded tunnel. In the case of the Wookey Hole project, this equated to the majority of the clothes and sleeping bags for the six-person team. Since the "drytubes" are cylindrical, a standard plastic Scuba back-



MEMBRANE DRYBAG



RIGID PVC DRYTUBE

pack is a wise addition for comfortable transport through dry passages. Attachment points for underwater transport are provided by fixing a 1-inch webbing loop to the tube at two locations using large stainless-steel hose camps, as shown in Figure 2.

HARNESS SYSTEMS

The amount of equipment that can be carried underwater by a diver, once the load is neutrally balanced (i.e., neither sinks nor rises) is limited primarily by the size of the passage and swimming speed considerations. Because life-support apparatus will almost always be at a premium in any location remote enough to require a camp, the amount of equipment going through on each transit of a sump should be maximized. During the Peña Colorada expedition, individual divers were typically able to carry two large expedition-size duffels, two PVC dry-tubes, or an eight-tank underwater sled (with an additional duffel bag on occasion). In Wookey Hole, where passage dimensions were considerably reduced, a single duffel or a four-tank sled was all that would fit.

No matter what the load, special modifications will need to be made to standard diving harnesses to accommodate this cargo. The method that has been adopted stems from "stage diving" techniques developed several years ago by Florida cave divers. Requiring greater air supplies for long distance explorations, divers like Sheck Exley, Paul DeLoach, and John Zumrick began clipping additional cylinders to their harnesses by mounting a series of large D-rings at shoulder level and at waist level. A stage bottle, basically a single tank with a pressure gauge and a regulator, would then be equipped with clips at both the bottom and top that in turn could be quickly connected to these D-rings. We simply substituted underground-camp loads for the stage bottles. The reasons for front-mounting the equipment are that it permits the load to be easily monitored and ditched if or when required, and it provides inherent attitude stability while swimming, since there is no tendency to flip over, as might be induced by a large back mounted load. Figures 3 and 4 show typical modifications to a back-mount harness system and to a side-mount (British) system for hauling cargo through a sump. In both cases it is a good idea to make the load slightly negative in the water and provide a large capacity stabilizing jacket (40 to 60 pounds) for fine tuning of buoyancy, since things will change somewhat as you descend and your wetsuit compresses.

One final note on transporting large amounts of equipment through a sump bears mentioning. Inertial and fluid friction forces will be high, which means a considerable amount of finning (and air consumption) will be required to get moving and change direction. One way of overcoming this is to lay a heavy gauge line, at least 8-millimeter diameter and made of nylon, so that the diver can pull himself along. Belay points, of course, must be carefully chosen both for stoutness and position, so as to avoid potential constrictions that might confront the diver in bad visibility conditions.

Camping beyond sumps will remain a novelty for a few years to come. As the amount of easily explorable, virgin cave continues to dwindle, however, exploring deep cave systems upward from their springs will become a routine alternative to working from the top down. Underground camps will form an integral part of these operations, since, despite likely technological advances in life-support apparatus, the exploration front will eventually exceed the endurance radius from a surface basecamp. The techniques described above represent our first attempts in designing a new generation of exploration hardware to meet this need.

Figure 3: Standard back-mounted harness with attachment D-rings for equipment transport. (Bill Stone)

Figure 4: Modified side-mount system (British) with shoulder straps and attachment D-rings for equipment transport. The two shoulder straps join in back and are clipped to the harness via an adjustable length of 1-inch webbing. (Bill Stone)

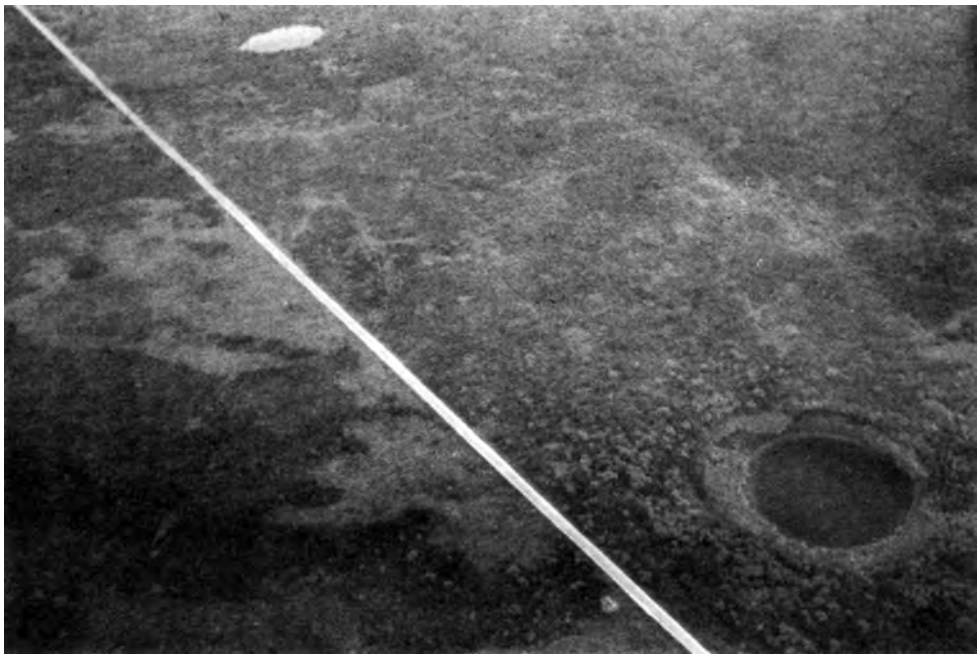
Transporting equipment through a sump. (Bill Stone)

ACAMPANDO MAS ALLA DE SIFONES

Esta es un discusión tecnica de metodos que se utilizan para transportar equipo a través de una serie de sifones, con el propósito de establecer campamentos subterráneos. Se dan sugerencias acerca de la clase de comida, utensilios y equipo apropiados para este tipo de campamentos y del tipo de empaques que deben utilizarse para su transporte (figuras 1 y 2). Tambien se discuten los estilos de arneses utilizados para mover y transportar los empaques (figuras 3 y 4).

THE DEEP CENOTES

by Carlos Lazcano Sahagún



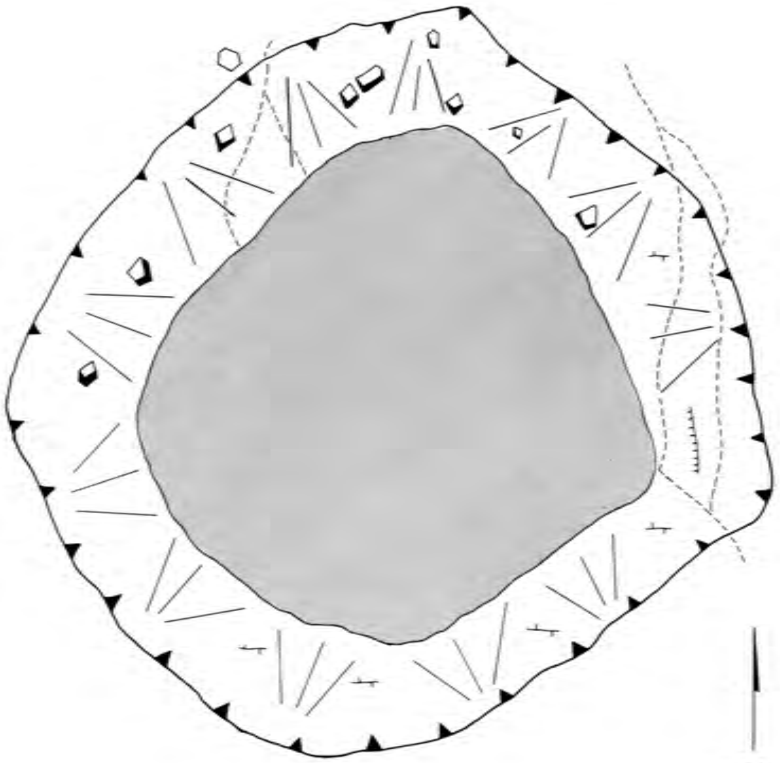
Thousands of cenotes like these dot the Yucatán Peninsula. (Carlos Lazcano)

It is well known that the Yucatán Peninsula has numerous karst features called cenotes, which often lead into underwater cavities. The word "cenote" is a Spanish adaptation of the Mayan word "ts'onot", meaning "cave containing water." During my recent explorations in the state of Yucatán (there are three states on the peninsula) I have visited over one hundred cenotes over the whole length and width of the state. These take many varied and beautiful forms. But in this article I would like to examine a specific type of cenote.

In the east-central portion of the state of Yucatán are located the deepest cenotes known to date. Between the towns of Izamal, Valladolid, and Cenotillo are various cenotes notable for their great water depth. Foremost among these is Cenote Xkolac, located 15 kilometers east of Izamal. The water has been plumbed to a depth of between 125 and 130 meters. Cenote Ucil, which is 4 kilometers north of Cenotillo, has water 100 meters deep. In the town of Valladolid is another of equal depth called Cenote Zac-ci.

CENOTE XKOLAC

Cenote Xkolac is an open-air circular pool 70 meters across. The surrounding dolina is densely vegetated and slopes into the water at an angle of 20 degrees. The water is deep green and somewhat cloudy, imparting a

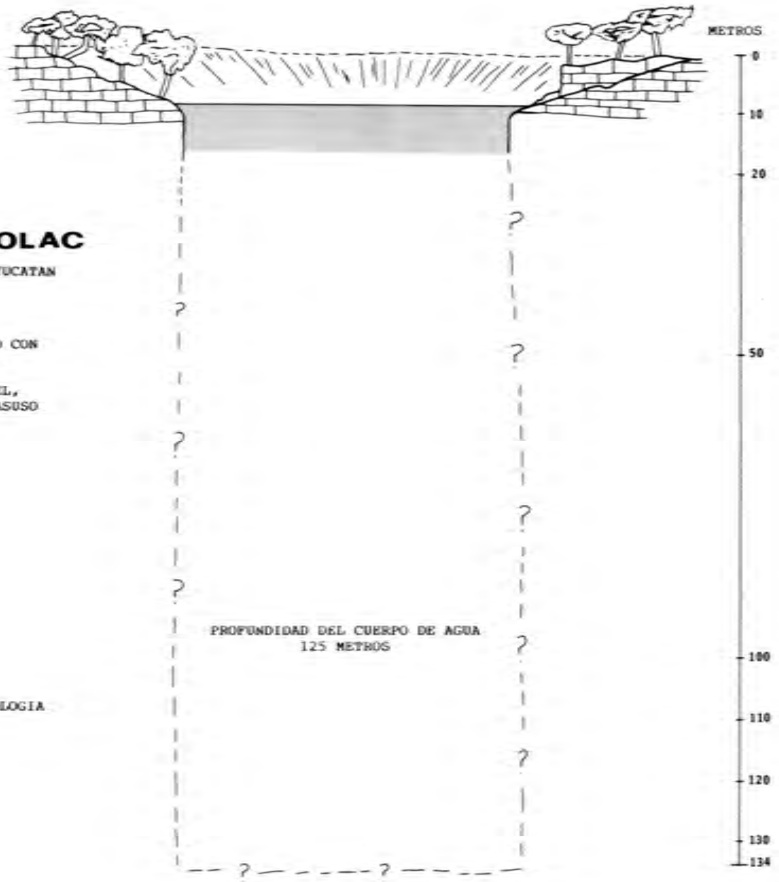


CENOTE XKOLAC

MUNICIPIO DE TUNKAS, YUCATAN

TOPOGRAFIA ELABORADO CON
SUUNTOS Y CINTA
JUNIO DE 1985
A. CAMARA, E. GRANIEL,
C. LAZCANO, M. VILLASUSO

COORDINACION DE HIDROLOGIA
UPI-FIUADY



DLP/TTS

At -125 to -130 meters, Cenote Xkolac is the deepest on the peninsula. (Carlos Lazcano)

mysterious aura. Of the many times I have been swimming in this cenote, I have never seen more than 2 meters visibility, only deep obscurity extending over 100 meters below. Miguel Villasuso, of the Universidad Autónoma de Yucatán, has been conducting water analysis in the cenote, and it was he that determined the water depth through numerous soundings. The deepest cenote on the peninsula, it is a true underwater abyss. One curious aspect is that the depth is virtually equal to the height of the highest point in the state, the Sierrita de Ticul, 126 meters above sea level.

Cenote Xkolac has not yet been explored by divers. The geochemists say that at 50 meters depth there are high concentrations of hydrogen sulfide (H_2S) and they warn against diving below that level.

During my many visits to this cenote, I have noticed a variety of fauna, including fish, turtles, frogs, some types of aquatic snakes, and numerous birds. A local resident says that until 10 years ago there were small alligators in the cenote. An attempt to commercialize Cenote Xkolac was made a number of years back, but the facilities are now abandoned.

CENOTE UCIL

Cenote Ucil is the most beautiful of these submerged pits. It is actually inside a cave, and it is lit by a 13-meter-diameter skylight directly above the pool. The crystal clear pool is 18 meters across and has a deep blue hue. The many depth measurements that have been taken show it to be between 98 and 102 meters deep. In contrast to Xkolac, Ucil has excellent visibility. Diver Mario Zarso has penetrated the cenote to a depth of 58 meters. Swimming in this cenote is very pleasant, a quite different sensation from that experienced in the sinister Xkolac.

Cenote Ucil is often visited by residents of the town of Cenotillo. At frequent gatherings the bravest will jump from the skylight to plunge deep into the water-filled pit. Mario Zarzo reports that the walls bell out 30 meter down, giving a feeling of immensity. At 50 meters depth, the only reference point is the direction of the diver's air bubbles.

THOUSANDS OF CENOTES

The third of these enormous flooded pits is Cenote Zac-ci, also known as Cenote de Valladolid, since it is located in the town of the same name. Like Ucil, it is very beautiful,

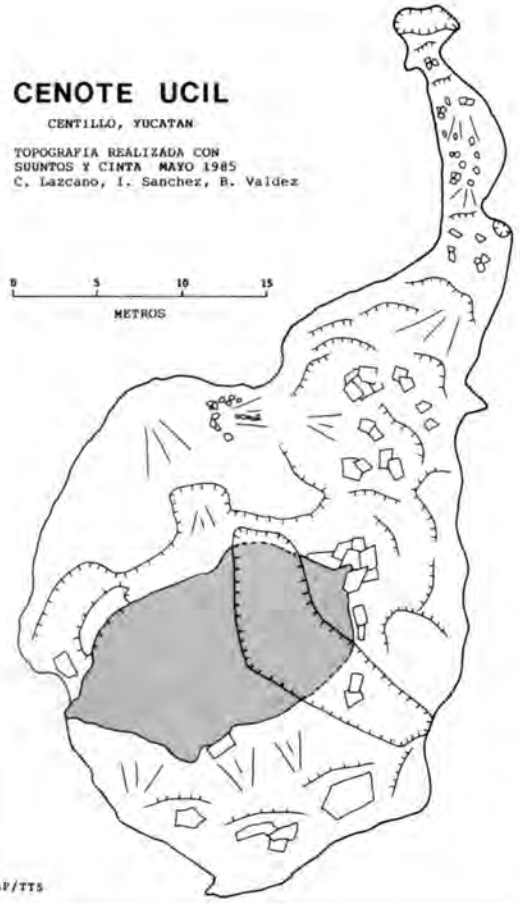
Cenote Zac-ci, located in the town of Valladolid, had been commercialized. (Carlos Lazcano)

CENOTE UCIL

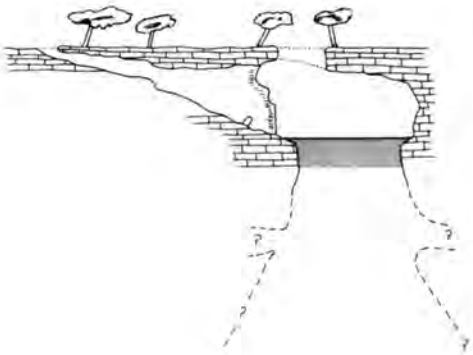
CENTILLO, YUCATAN

TOPOGRAFIA REALIZADA CON
SUUNTOS Y CINTA MAYO 1985
C. Lazcano, I. Sanchez, B. Valdez

0 5 10 15
METROS



N



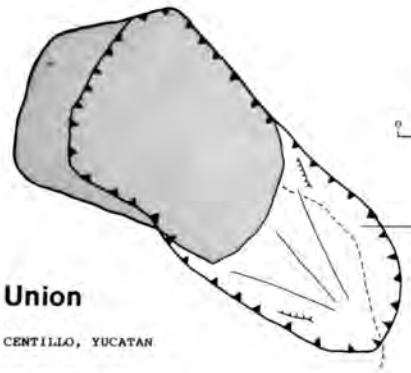
METROS
0
10
20
30
40
50
60
70
80
90
100
110
111

Profundidad alcanzada
por el hombre

COORDINACION DE HIDROLOGIA
UPI-FIUADY

Profundida del cuerpo
de agua: 98 metros

DLP/TTS



N

0 5 10 15 20
Metros

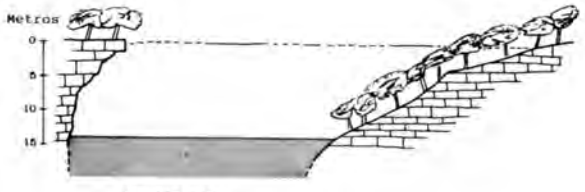
Cubierto con
mucha vegetacion

Cenote Union

RANCHO UNION
MUNICIPIO DE CENTILLO, YUCATAN

Croquis Elaborado por:
C. Lazcano
J. Sanchez
B. Valdez
Mayo de 1985

COORDINACION DE HIDROLOGIA
UPI-FIUADY



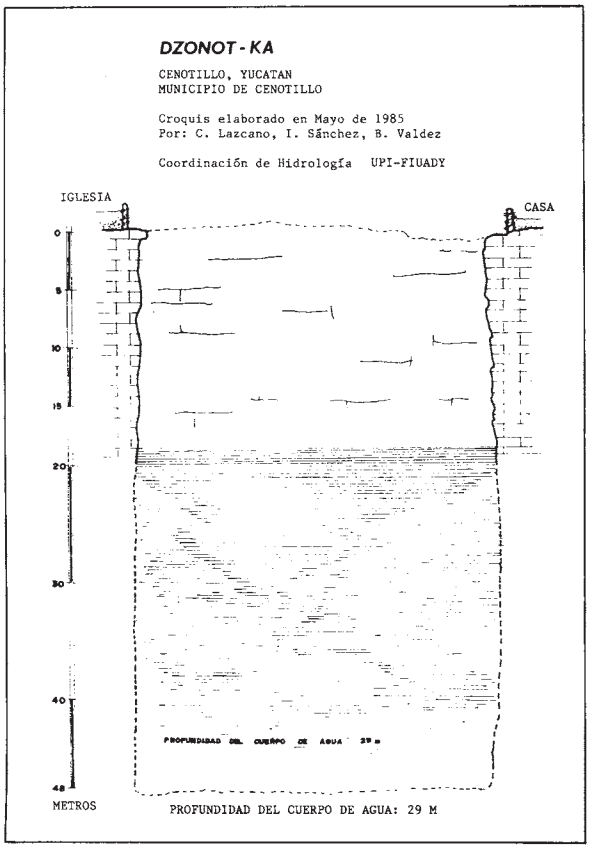
Metros
0
5
10
15

No Sondeado

DLP/TTS

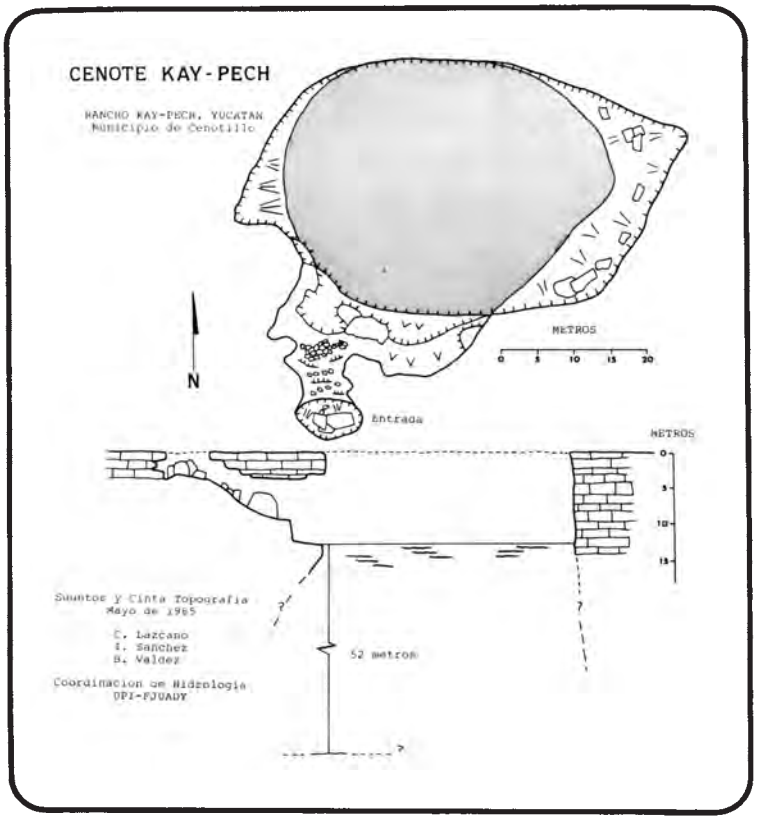
but it is polluted and therefore not used for bathing. The clear waters are an intense blue, and are about 100 meters deep. Some diving has been done, but to no great depth. This cenote has been commercialized, and a fee is charged to enter.

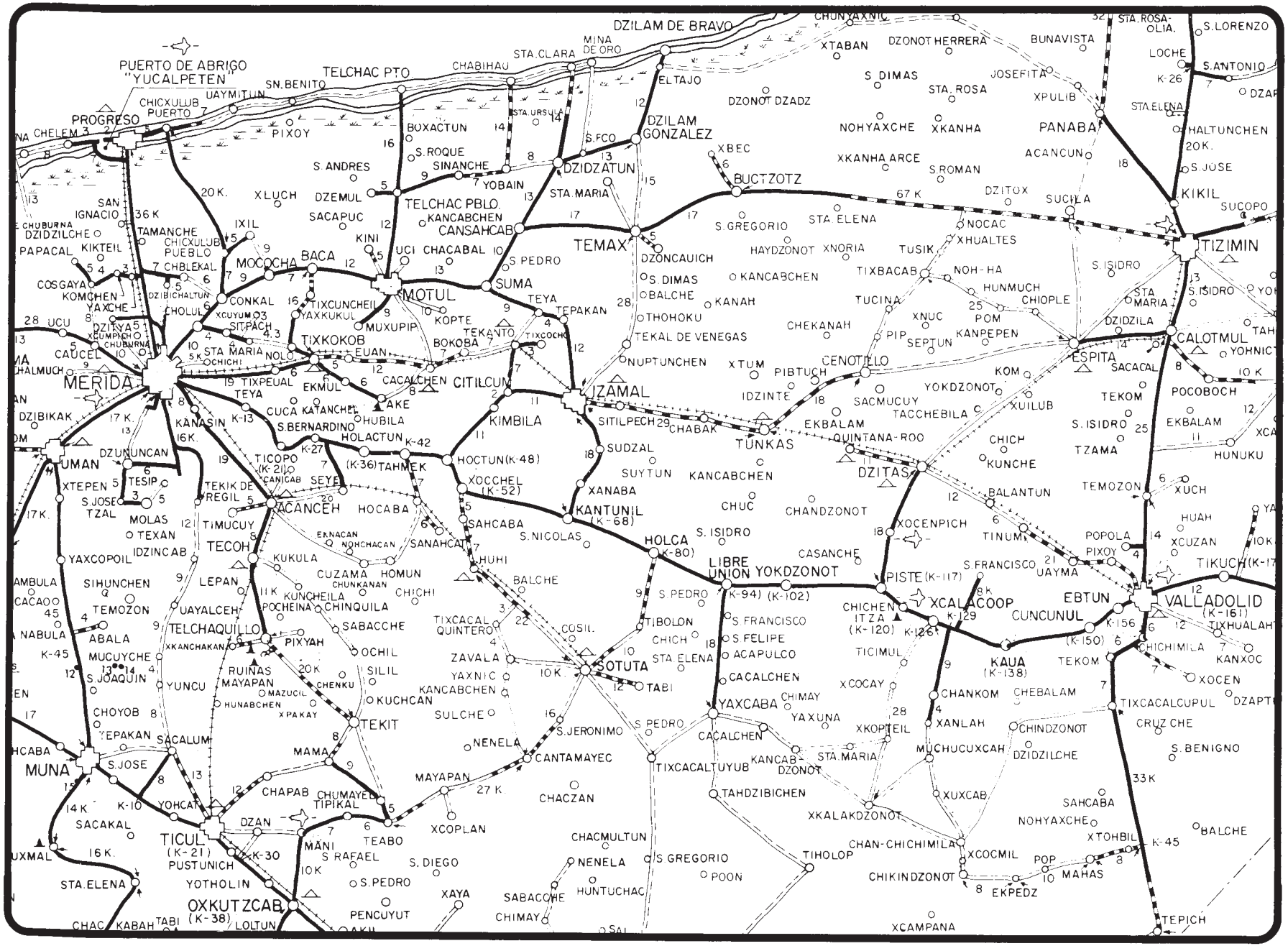
Besides these three cenotes, another one of 100 meters depth, is known in the town of Leona Vicario in the state of Quintana Roo. In the area around Cenotillo there are no less than 50 cenotes. We have measured some of these and found them, for the most part, to be between 40 and 60 meters deep. In general, it can be said that in the eastern part of Yucatán the proportion of deep cenotes is high, whereas they are rare in the western part. A surprising thing is that all the cenotes have local names, no matter how small or isolated they are. They are well-known locally and have names in the Mayan tongue. In all of the peninsula there are probably thousands of cenotes.



ABISMOS SUMERGIDOS EN YUCATAN

El autor ha visitado más de cien cenotes (adaptación al español de la palabra maya "ts'onot " que significa "cueva que contiene agua"), a lo largo y ancho del estado de Yucatán. El artículo examina los cenotes más profundos conocidos hasta la fecha. La profundidad del Cenote Xkolac, que se localiza a 15 kilómetros al este de Izamal, ha sido sondeado entre 125 y 130 metros. No ha sido explorada por buceadores, ya que, según geoquímicos este presenta una alta concentración de ácido sulfídrico (H_2S) a los 50 metros de profundidad. El Cenote Ucil se localiza a 4 kilómetros al norte de Cenotillo y se encuentra dentro de una cueva, su boca mide 13 metros de diametro y sus aguas alcanzan una profundidad de 100 metros. Los rayos del sol caen directamente por encima de su estanque el cual mide 18 metros a lo largo, sus aguas son claras y cristilinas. El Cenote Zac-ci, también tiene aguas claras, de un color azul intenso y alcanzan aproximadamente una profundidad de 100 metros.




DZILAM DE BRAVO
PUERTO DE ABRIGO "YUCALPETEN"
TELCHAC PTO
PROGRESO
CHICXULUB PUERTO
UAYMITUN
SN. BENITO
CHABIHAU
STA. CLARA
MINA DE ORO
CHUNYAXNIC
XTABAN
DZONOT HERRERA
BUNAVISTA
STA. ROSA-OLIA.
S. LORENZO
LOCHE
S. ANTONIO
K-26
DZAP
STA. ELENA
HALTUNCHEN
20K.
S. JOSE
KIKIL
SUCOPO
PIXOY
BOXACTUN
S. ROQUE
SINANCHE
YOBAIN
STA. URSULA
S. FCO
DZILAM GONZALEZ
EL TAJO
DZONOT DZADZ
S. DIMAS
STA. ROSA
JOSEFITA
XPULIB
PANABA
NOHYAXCHE
XKANHA
XBEC
XKANHA ARCE
S. ROMAN
ACANCUN
S. ANDRES
DZEMUL
XLUCH
SACAPUC
TELCHAC PBLO.
KANCABCHEN
DZIDZATUN
STA. MARIA
BUCTZOTZ
67 K
DZITOX
SUCILA
S. GREGORIO
STA. ELENA
NOCAC
SAN IGNACIO
36 K
TAMANCHE
CHICXULUB PUEBLO
IXIL
CANSAHCAB
KINI
UCI
CHACABAL
S. PEDRO
TEMAX
DZONCAUICH
HAYDZONOT
XNORIA
TUSIK
XHUALTES
TIZIMIN
S. ISIDRO
PAPACAL
KIKTEIL
COSGAYA
KOMCHEN
YAXCHE
CHBLEKAL
MOCOCHA
BACA
MOTUL
SUMA
S. DIMAS
KANCABCHEN
BALCHE
KANAH
TIXBACAB
NOH-HA
HUNMUCH
CHIOPLE
TUCINA
STA. MARIA
S. ISIDRO
CONKAL
TIXCUNCHEIL
YAXKUKUL
MUXUPIP
KOPTE
TEKANTO
TEYA
TEPAKAN
THOHOKU
TEKAL DE VENEGAS
CHEKANAH
XNUC
POM
PIP
SEPTUN
KANPEPEN
DZIDZILA
CALOTMUL
TIXKOKOB
EUAN
BOKOBA
NUPTUNCHEN
XTUM
PIBTUCH
CENOTILLO
ESPITA
SACACAL
POCOBOCH
10 K
MERIDA
TIXPEUAL
EKMUL
CACALCHEN
CITILCUM
IZAMAL
IDZINTE
SACMUCUY
YOKDZONOT
KOM
TEKOM
CUCA
KATANCHEL
AKE
HUBILA
KIMBILA
SITILPECH
CHABAK
EKBALAM
QUINTANA-ROO
TUNKAS
XUILUB
TACCHEBILA
S. ISIDRO
EKBALAM
HUNUKU
DZIBIKAK
17 K.
KANASIN
16K.
K-13
S. BERNARDINO
HOLACTUN
K-42
SUDZAL
SUYTUN
KANCABCHEN
CHICH
KUNCHE
TZAMA
DZUNUNCAN
TICOPO (K-21)
CANICAB
(K-36)
TAHMEK
HOCTUN (K-48)
DZITAS
TEMOZON
XUCH
XTEPEN
TESIP
S. JOSE
TZAL
SEYE
TEKIK DE REGIL
ACANCEH
HOCABA
XOCCHEL (K-52)
XANABA
KANTUNIL (K-68)
CHUC
CHANDZONOT
BALANTUN
HUAH
TIMUCUY
MOLAS
TEXAN
SAHCABA
S. NICOLAS
HOLCA (K-80)
S. ISIDRO
XOCENPICH
TINUM
POPOLA
XCUZAN
TECOH
EKNACAN
NOHCHACAN
SANAHCAT
HUHI
CASANCHE
PIXOY
IDZINCAB
YAXCOPOIL
KUKULA
CUZAMA
HOMUN
CHUNKANAN
CHICHI
LIBRE UNION
YOKDZONOT
S. FRANCISCO
UAYMA
TIKUCH (K-17)
SIHUNCHEN
LEPAN
BALCHE
S. PEDRO
PISTE (K-117)
(K-94)
(K-102)
CHICHEN ITZA (K-120)
XCALACOOP
K-129
EBTUN
CUNCUNUL
K-156
(K-150)
VALLADOLID (K-161)
TIXHUALAHT
TEMOZON
UAYALCEH
KUNCHEILA
POCHEINA
CHINQUILA
TELCHAQUILLO
XKANCHAKAN
PIXYAH
SABACCHE
OCHIL
TIXCACAL QUINTERO
COSIL
TIBOLON
CHICH
S. FRANCISCO
S. FELIPE
ACAPULCO
CACALCHEN
ZAVALA
SOTUTA
STA. ELENA
TABI
TICIMUL
KAUA (K-138)
TEKOM
CHICHIMILA
KANXOC
ABALA
MUCUYCHE
S. JOAQUIN
YUNCU
RUINAS MAYAPAN
MAZUCIL
CHENKU
SILIL
HUNABCHEN
XPAKAY
KUCHCAN
YAXNIC
KANCABCHEN
YAXCABA
CHIMAY
XCOCAY
CHANKOM
CHEBALAM
XOCEN
TIXCACALCUPUL
DZAPT
CHOYOB
YEPAKAN
SACALUM
TEKIT
SULCHE
S. JERONIMO
S. PEDRO
XANLAH
CHINDZONOT
CRUZ CHE
MUNA
S. JOSE
MAMA
NENELA
CANTAMAYEC
CACALCHEN
XKOPTEIL
MUCHUCUXCAH
DZIDZILCHE
S. BENIGNO
TIXCACALTUYUB
KANCAB-DZONOT
STA. MARIA
MAYAPAN
27 K.
CHACZAN
TAHDZIBICHEN
XUXCAB
33K
SAHCABA
CHAPAB
CHUMAYEL
TIPIKAL
YOHCAT
K-10
14 K
SACAKAL
DZAN
XCOPLAN
XKALAKDZONOT
NOHYAXCHE
XTOHBIL
K-45
BALCHE
TICUL (K-21)
PUSTUNICH
K-30
MANI
S. RAFAEL
TEABO
CHACMULTUN
CHAN-CHICHIMILA
XCOCMIL
POP
MAHAS
16K.
STA. ELENA
YOTHOLIN
S. DIEGO
S. PEDRO
NENELA
S. GREGORIO
TIHOLOP
POON
CHIKINDZONOT
EKPEDZ
OXKUTZCAB (K-38)
PENCUYUT
XAYA
SABACCHE
HUNTUCHAC
CHIMAY
XCAMPANA
TEPICH
CHAC
KABAH
TABI
LOLTUN

Sótano de

San Marcos

Peter Keys at the entrance to Sótano de San Marcos. (Dale Pate)

The Second Drop, a 15-meter descent in vertical bedding. (Peter Sprouse)

by Peter and Terri Sprouse

Due west of Ciudad Victoria, Tamaulipas, the Sierra Madre narrows to what is essentially a single ridge rising from the western edge of the city. In the area around Sótano de San Marcos the limestone outcrop is confined to a 5-kilometer wide band of westward- dipping rocks on the western side of the ridge. The entrance to the cave is at the western edge of the limestone, near the contact with the overlying shales.

A group of cavers from Houston, Texas, were told about Sótano de San Marcos while prospecting for caves near La Reforma in November 1983. Mike Connolly, Dick Cruse, Charles Fromén, and Harry Walker were led through the desert scrub to the inconspicuous entrance above the side of an arroyo. The entrance is about 2 meters wide and 1.5 meters high, and slopes down steeply in near-vertical bedding. Strong airflow enticed them down a short climb, and then suddenly they were stopped by a major pit. Charles descended on the only rope they had, but soon found himself dangling at the knot. Three months later the group (less Connolly) returned and descended the full 60 meters to the bottom of the drop. At the bottom was a large passage that took off to the north, descending gently over large boulders to a sand floor. After 50 meters of fairly level passage, they downclimbed into a larger room dominated by dramatic folds of chert. This soon lowered to a comfortable sand crawl, named Cow Crawl, that is actually a low area in the passage that floodwaters keep clean. They climbed up again in a wet tube that wound around to a pool, Oyster Pond. The passage split at the pool, with the right-hand way through the pool leading to a drop. The left passage climbed up to a small tube that also intersected the drop.

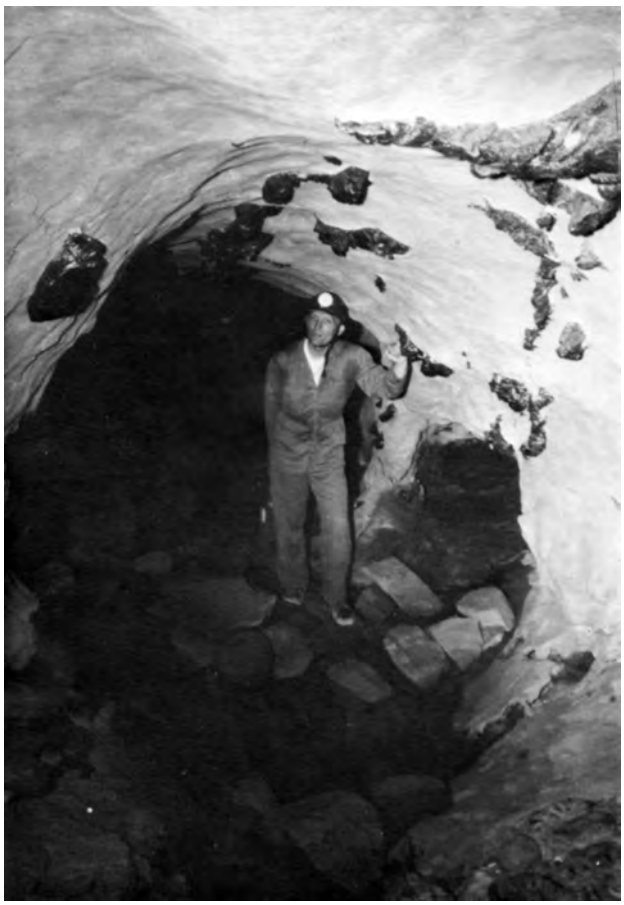
A third trip was made in April 1984 by Charles, Harry, Mike Green, and Bruce McCabe. They rigged the second drop from the high tube, for a 15-meter descent. Below, the cave trended north again, up a long talus slope. Noting an interesting drop on the right side of the passage, they pushed several hundred meters on down a series of climbs to an apparent sump.

THE SURVEY

On 31 August 1984 Margaret Hart, Peter Keys, Dale Pate, Peter Sprouse, and Terri Sprouse joined forces with Charles Fromén to check side leads and begin a detailed survey. The group visited the lush springs of the Río Guayalejo before proceeding to the desert camp just outside of La Reforma. Threatening clouds caused some concern about flooding, since the cave entrance lies only four meters above a major arroyo. But little rain fell, and in the morning they made their way up the arroyo to the entrance, situated at about 850 meters above sea level.

On the way in, a promising sidepassage was noted on the right side in the Chert Room. Below the second drop, Peter, Peter, and Charles surveyed down the unexplored pit on the right side of the main passage. The drop sloped steeply down over flowstone for 12 meters, and the passage continued to drop quickly in a straight canyon to a small sump, down which the passage continued. Interestingly, large troglobitic cirolanid isopods, which were later identified as speocirulana endeca, were discovered in this sump. This isopod is also present in the streams in Sótano de Las Calenturas and Cueva del Tecolote to the north.

Meanwhile Dale, Margaret, and Terri mapped into a left-hand passage a little further on that had good airflow. After about 35 meters of small, sinuous passage, it opened into



Charles Fromén in passage below the 60-meter first drop. (Peter Sprouse)

a large pit that appeared to be about 10 to 12 meters deep and about 10 meters across to the far wall. Across the pit at the same level they could see a passage taking off. The two teams regrouped in the main passage. Margaret and Terri headed out, while the others continued on down to have a look at the terminal sump. As the last people climbed out and derigged the long rope, Dale, Margaret, and Terri mapped the entrance passage to the top of the 60-meter drop.

FLATROCK CANYON

Back in Austin, Peter and Terri organized a return trip to Sótano de San Marcos for mid-October. They recruited Paul Fambro, Jim Pisarowicz, Karen Rosga, and Mike Warton to continue the survey and exploration. After the usual swim at the Guayalejo they set up camp near Reforma. The next day, 14 October, they made their way to the cave.

The 60-meter drop was accurately measured and Mike Warton checked a passage across the top of the drop. It led to a parallel shaft that connected in to the 60-meter drop. At the bottom of the drop they split into two teams to survey the main route through the cave. Jim, Karen, and Terri mapped to the second drop, while Peter, Paul, and Mike surveyed from the second drop to the sump lake. Mike stripped down to have a better look at the lake. To the right he found a dome that looked difficult and not too promising. To the left he went through a low airspace to more swimming. Then he went down a climb to a sump that looked deep. On the way out they mapped a couple of short side passages and took a look at the next objective--the third drop.

A day of recovery at the nacimiento was required before exploration was resumed on the 16th. The same survey teams were formed. Jim, Karen, and Terri mapped the right-hand passage at the Chert Room. The Guano Express, as they called it, descended steeply to a 3-meter drop. This is one of the few accessible leads that remain in the cave. Just before Oyster

Gravel crawl near low airspace at end of main passage. (Peter Sprouse)

Pond, they mapped a right-hand passage that led to two domes. One didn't go and the other was too difficult to climb. Another side passage, on the left, was mapped to a dome, Moaning Rock chamber.

The other team descended the third drop at the end of the blowing left-hand passage. The passage across the top of the pit, which may be the source of the air, did not appear accessible without direct aid. An investigation of the room at the bottom of the 10-meter drop quickly revealed another pit. This area was soon named Flat Rock Canyon, due to all the loose rock collapsed from the vertical beds. Below the fourth drop, also 10 meters, they pushed a water-crawl to a junction, where both ways led to a mud room. Beyond was a nearly inundated crawl too small to get through. A new species of schizomid (an arachnid) was collected in this area.

MORPHOLOGY

The present survey of Sótano de San Marcos shows it to be 1019 meters long and 126 meters deep. The vertical bedding and profusion of chert make it a very beautiful and geologically interesting cave. It is situated at the western edge of the Huisachal anticline, where the limestone plunges to great depths below the shales and conglomerates of the Jaumave valley. The bedding in the cave often varies from a 60-degree dip to nearly vertical, with some folds being visible, notably in the Chert Room.

The vertical nature of the rock is expressed in the many domes in the cave. Considerable unexplored passage may exist above these domes, but great effort would be required to explore them from below. The airflow in the cave suggests that some high leads may indeed connect to other entrances higher on the mountain.

The low areas in the cave tend to all sump, but not on exactly the same level. It is not clear that these are necessarily downstream sumps. It is possible that during times of groundwater flooding, water may be pushed out of these sumps. On the other hand, flood water may sometimes enter the cave from the surface arroyo and flow down the main passage to the sumps. In any case, the up and down nature of the main passage as it makes its way to the sumps suggests a complex hydrologic past.

HIGH SINKS

A logical place to look for a higher entrance into San Marcos is at Las Hoyas, a mountain valley 5 kilometers to the north. Several sinks were located by Peter Sprouse and Terri Sprouse in May 1984, the most promising of which, Cueva de Las Hoyas, they pushed in April 1985 with the help of Andy Davison. A short arroyo drops into the sheer-walled entrance sink, then the drainage enters a low crawl. A 3-meter ladder drop is encountered almost immediately, below which the passage again lowers. Then the floor drops down 2 meters to the edge of a 31-meter pit. Andy and Peter descended the drop, discovering passages going both upstream and downstream. The upstream route pinched, and downstream soon lowered to a bellycrawl in water. Andy bravely pushed on through to where a hammer is needed to knock off some flakes. It seemed to get bigger on the far side, and carried good airflow. But considering the nature of the cave so far, chances may be slim for a connection to San Marcos.

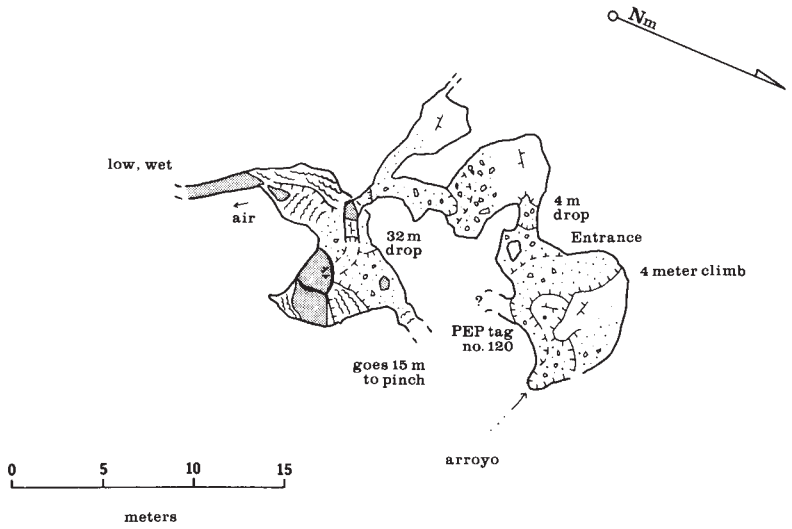
Andrew Davison exits wet bellycrawl in Cueva de Las Hoyas. (Peter Sprouse)

CUEVA DE LAS HOYAS
Asunción, Tamaulipas

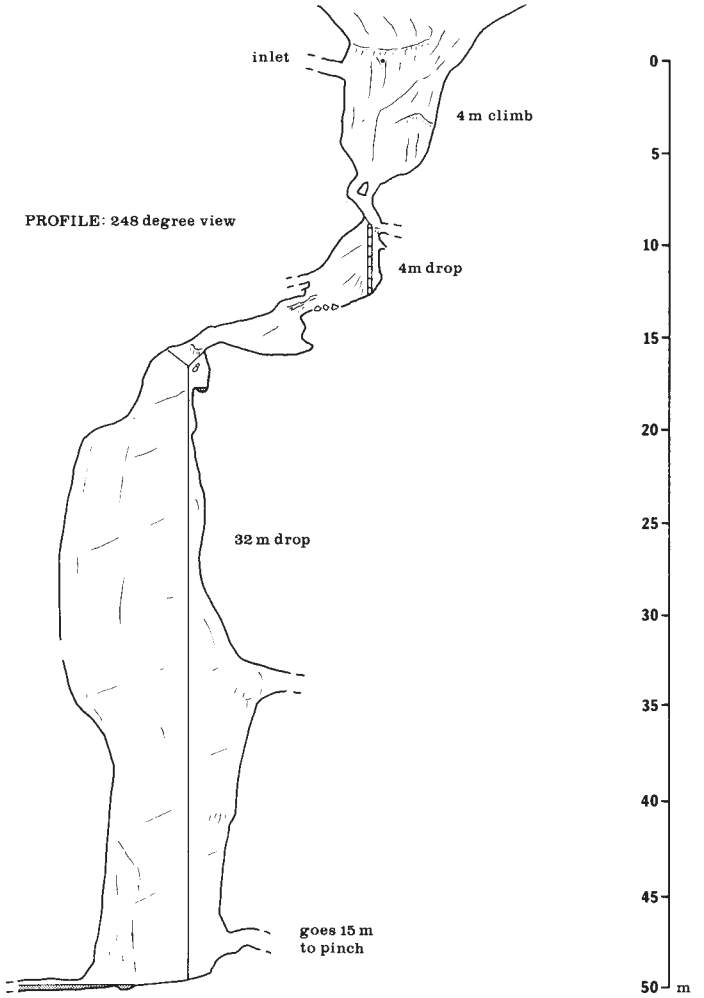
Suuntos and tape survey 11-12 April 1985
Andrew Davison, Peter Sprouse, Terri Sprouse
Proyecto Espeleológico Purificación
Drawn by Peter Sprouse

Traverse length: 81 meters Depth: 50 meters

PLAN: Rotated 248 degrees



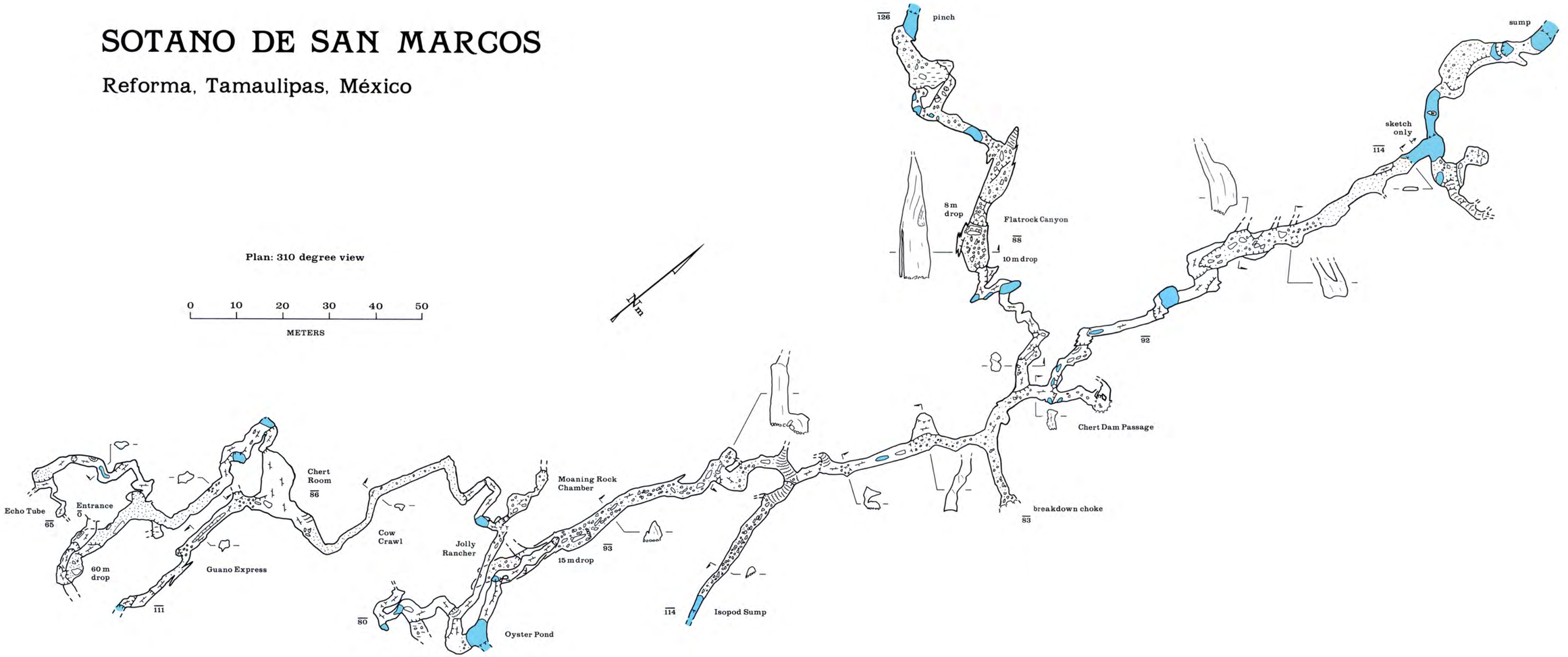
PROFILE: 248 degree view



10-85

SOTANO DE SAN MARCOS

Reforma, Tamaulipas, México



ASSOCIATION FOR MEXICAN CAVE STUDIES

PROYECTO ESPELEOLOGICO PURIFICACION

SOTANO DE SAN MARCOS

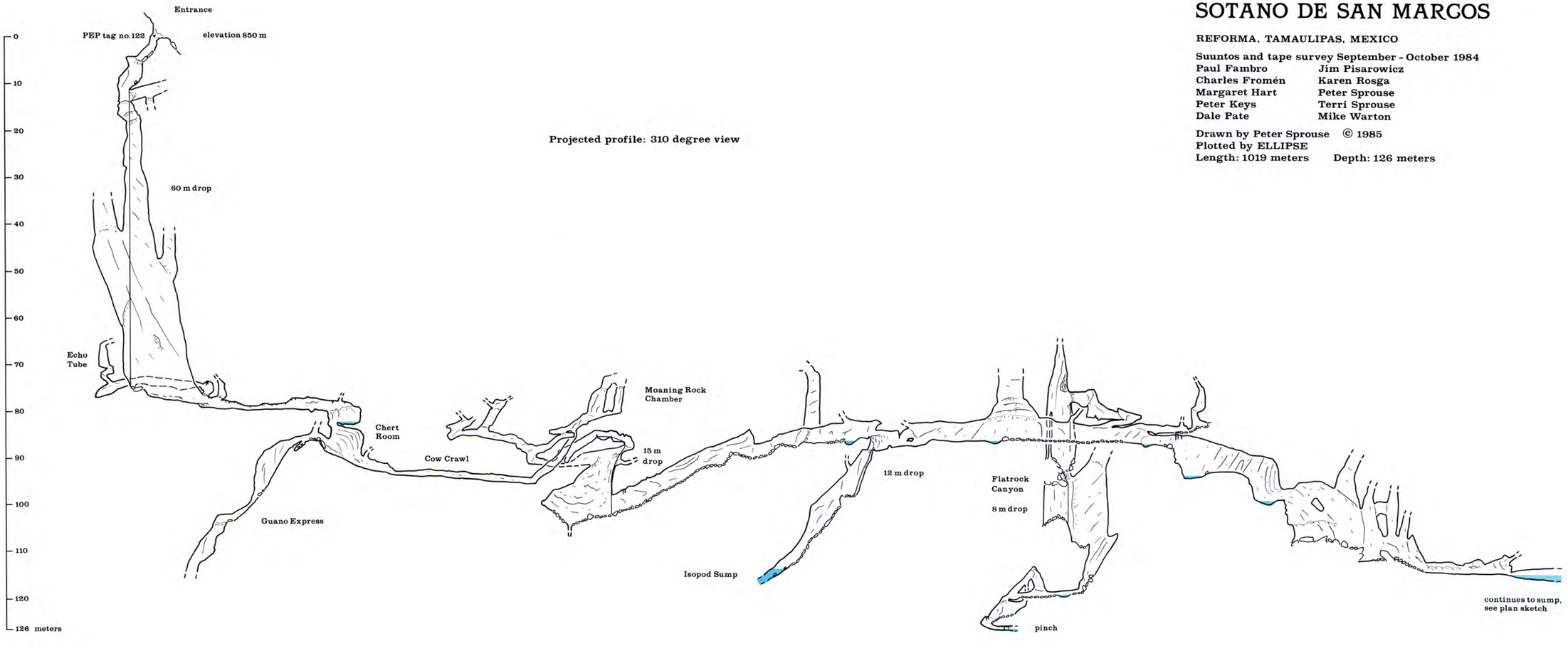
REFORMA, TAMAULIPAS, MEXICO

Suuntos and tape survey September - October 1984

Paul Fambro	Jim Pisarowicz
Charles Fromén	Karen Rosga
Margaret Hart	Peter Sprouse
Peter Keys	Terri Sprouse
Dale Pate	Mike Warton

Drawn by Peter Sprouse © 1985
Plotted by ELLIPSE
Length: 1019 meters **Depth: 126 meters**

Projected profile: 310 degree view



ASSOCIATION FOR MEXICAN CAVE STUDIES

PROYECTO ESPELEOLOGICO PURIFICACION

SOTANO DE SAN MARCOS

El Sótano de San Marcos está situado al oeste de Ciudad Victoria, Tamaulipas, cerca del poblado de La Reforma. Fué localizado y explorado parcialmente en 1983, posteriormente se hicieron más exploraciones y se topografió en 1984. Está situado al lado del Anticlinorio Huisachal, en donde la caliza se hunde a grandes profundidades abajo de las lutitas y conglomerados del valle de Jaumave. La profundidad total de la caverna es de 126 metros. Su tiro más largo es de 60 metros, y los niveles más bajos terminen en sifones. La longitud de la parte topografiada es de 1090 metros. Aunque existen numerosos domos en lo alto que continuan inexplorados. El flujo de aire en la cueva sugiere que estos ramales altos pueden conectar con otra entrada en alguna parte más alta de la sierra.

Dos viajes fueron hechos a Las Hoyas, en un valle en la sierra a 5 kilómetros al norte del Sótano de San Marcos. Se localizaron varias entradas, y una, Cueva de Las Hoyas, fué topografiada a -50 metros. La exploración se detuvo en un paso estrecho, sin embargo se presentaba un buen flujo de aire.

Limestone-superior shale contact in Arroyo San Marcos. (Jim Pisarowicz)

The Jolly Rancher passage in Sótano de San Marcos. (Terri Sprouse)

Caving Near

TENERIAS, GUERRERO

by Pablo and Mauricio Tapie

It was in August 1984 that Pablo Pérez-Redondo, Mauricio Tapie, Pablo Tapie, and Carlos Lazcano planned to explore an area near Grutas de Cacahuamilpa, in the municipio de Taxco, Guerrero. But, due to the rainy season the dirt roads were very bad, so they set out for a new zone to the north near Tenerias, 35 kilometers west of Taxco.

Questioning the locals in the area, they were told of a place called Membrillos where there was a "sótano muy hondo," which they later called Sótano Hoyo Hondo. After 26 kilometers of gravel road and 4 kilometers of dirt road, they arrived at the small town of Membrillos. A camp was set up and several caves, including the Hoyo Hondo, were located. Consulting with local residents Don Ermilo and Don Eutimio, they found out about many caves. Two of these were small, 8 meters and 20 meters in length, and nearby was a resumidero that seemed impossible to enter, even in the dry season, due to the amount of water that went in the small entrance. Also discovered at that time were Hoyo Hondo, Hoyito de los Pablos, and Gruta de Malhuantla, which was 6 kilometers from Membrillos.

FLOOD!

Hoyo Hondo is located about 1 kilometer from the main Membrillos road. The first drop is 47 meters. Fifteen meters down it opens into a large room with a flat clay floor. A muddy passage leads down to a shallow sump. The walls are well-decorated with many large stalactites.

During the exploration of Hoyito de los Pablos on 25 August 1984, the cavers had a dangerously close call. The dolina around the entrance funnels much water into the entrance passage when it rains. There is an 11-meter drop inside, and the cave reaches a total depth of 28 meters and is 50 meters long. There is a dry gallery and an active crawl that leads to the sandy terminal sump.

After completing the survey, they started out at about 7 p.m. As Mauricio was climbing the rope, a sudden rush of water entered the cave. Carlos urged Mauricio on, but the pit quickly became an impressive cascade. The water beat his body and hindered his breathing, halting his ascent. Fortunately he was able to swing under a ledge only 2 meters below the top, where he could wait for the water to subside. But he had no way of knowing

if it would last all night.

Meanwhile Mauricio's brother Pablo was waiting at the top unable to help. He leaned over the drop grasping the rope, encouraging Mauricio. Fortunately, after 15 long minutes the flood decreased, and, not knowing if it would rain more, Mauricio ascended as soon as he could. Afterwards they took shelter at the house of Don Eutimio to eat and celebrate the successful escape.

MALHUANTLA

On the same trip the locals showed them the entrance to Gruta de Malhuantla. The next weekend Sergio Garcés, Hector Garcia, Rodrigo Quezada, Pablo Perez-Redondo, Mauricio Tapie, and Pablo Tapie returned and surveyed the first 80 meters of the cave.

On the same trip the cavers discovered and mapped Cueva de Tescalitos. They were shown the cave by the owner, Don Baltazar Baena, who gave them permission to enter. At the entrance, which is only 45 centimeters across, a handline is needed to descend. Off of the first room is a drop of 7 meters, which they descended to reach the second room. Here they found large breakdown blocks the size of small houses. At the bottom of this room a narrow squeeze led to the third chamber, and the final drop of 10 meters. Animal bones were found at this point, which is unusual due to the difficult access. This suggests the possible existence of another passage that is now collapsed.

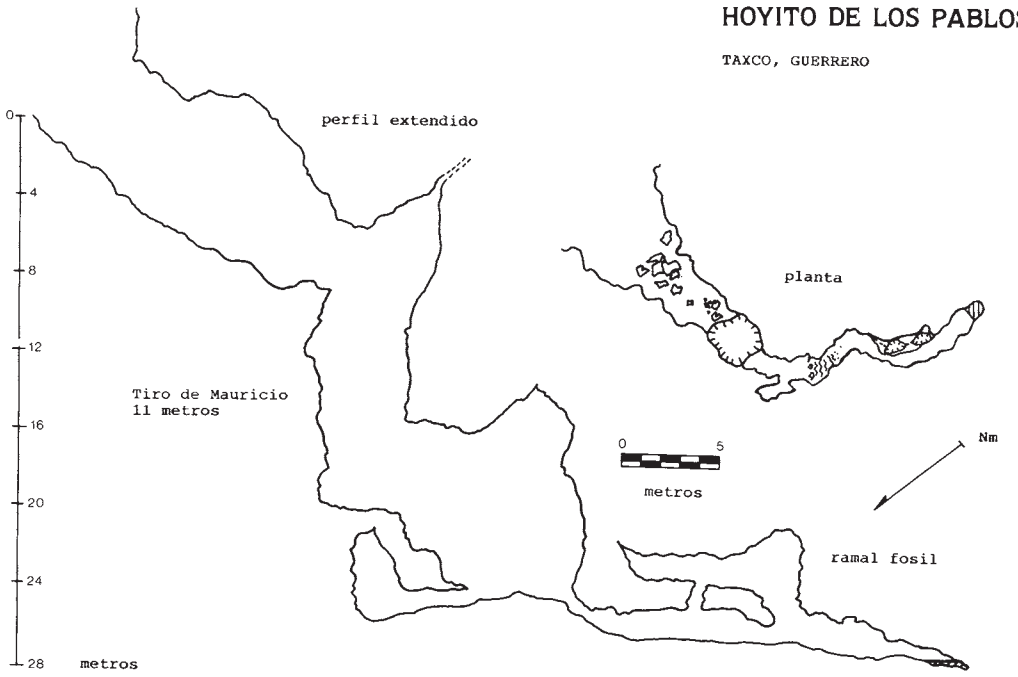
On 3 November 1984 Pablo Perez-Redondo, Hector Rivero, Mauricio Tapie, and Pablo Tapie returned to continue the exploration of Gruta de Malhuantla. It was explored to a length of about 1 kilometer, including side passages. The entrance is a resurgence well hidden in trees and brush. Vampire bats and crystals were seen inside. Exploration stopped at a 13-meter climb.

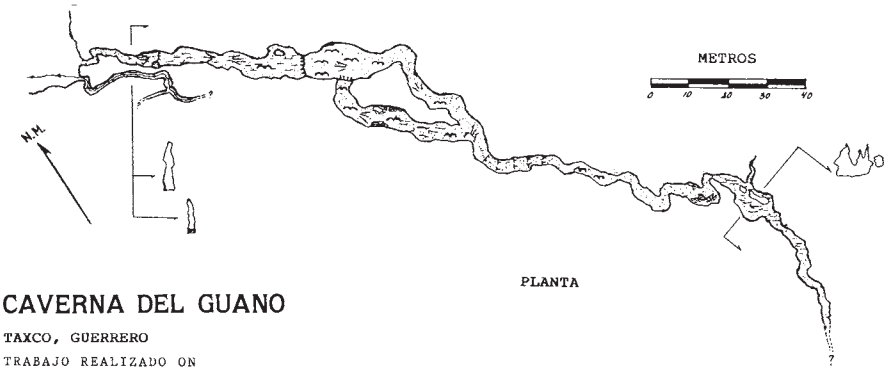
The exploration of Gruta de Malhuantla was not continued until 8

Above: Pablo Tapie during flood in Hoyito de los Pablos. (Carlos Lazcano)
Opposite: A climb in Hoyito de los Pablos. (Carlos Lazcano)

HOYITO DE LOS PABLOS

TAXCO, GUERRERO





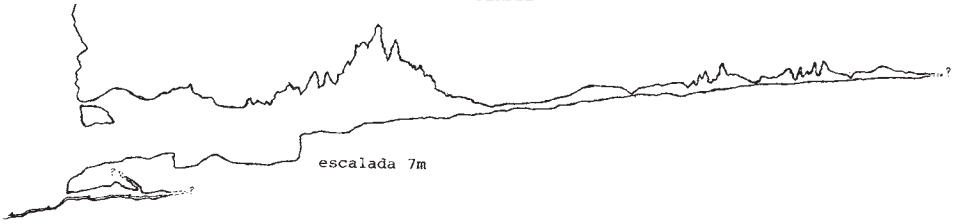
PLANTA

CAVERNA DEL GUANO

TAXCO, GUERRERO

TRABAJO REALIZADO ON
SUUNTOS Y CINTA POR:
PABLO TAPIE V.
MAURICIO TAPIE V.
PABLO PEREZ-REDONDO K.
CARLOS SANCHEZ V.
AIRAM SAIRUTSA
JAVIER SALIDO
DIBUJADO POR MAURICIO TAPIE

PERFIL



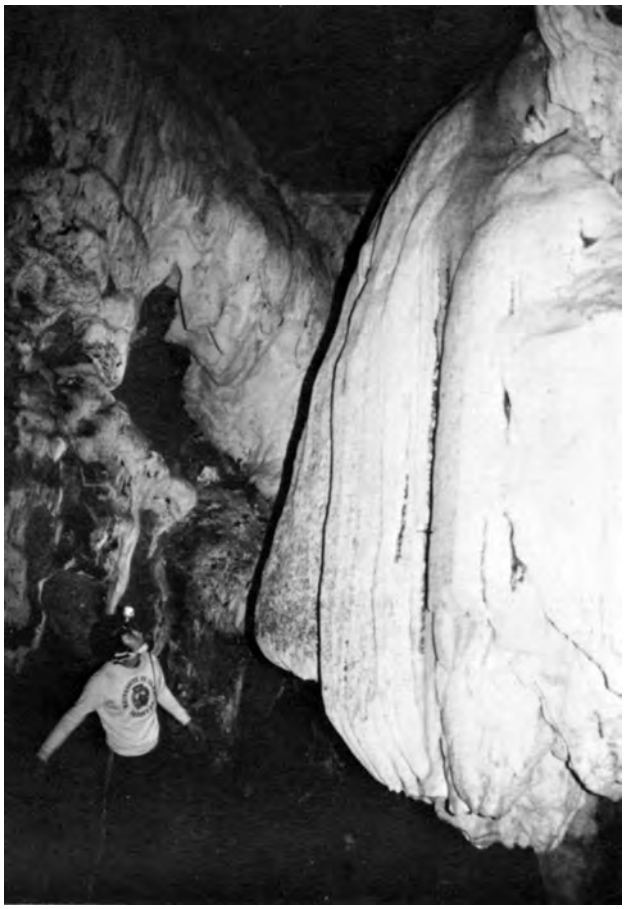
November 1985, after the major earthquake of 19 September. Recent collapse was evident in several areas in the cave, particularly toward the back. The 13-meter climb had changed to a fissure too narrow to be explored.

TIERRA COLORADA

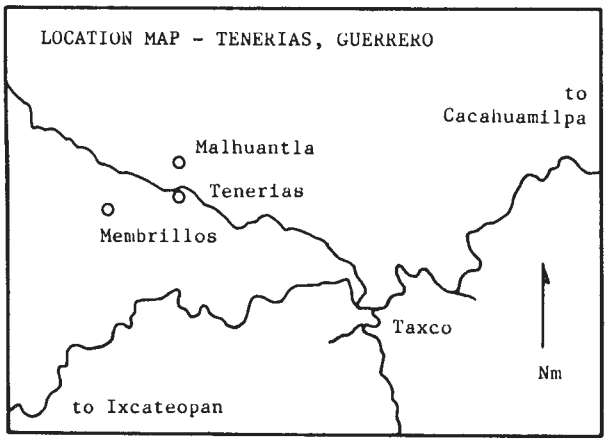
On 29 December 1984 Quas Claude, Baio Fabio, Pablo Peréz-Redondo, Carlos Sanchez, Mauricio Tapie, Pablo Tapie, and Airam Zairutsa made another trip to the Membrillos area. There was some trouble initially, but then the mayor, Don Francisco Martínez, gave them permission. On this trip they discovered Hoyito de la Tierra Colorada at Membrillos and Caverna del Guano near Malhuantla.

They entered the attractive entrance of Hoyito de la Tierra Colorada and explored down a 30-degree slope to what seemed to be the end of the cave. Then they discovered a small hole. They threw rocks down it and it seemed to go. They enlarged the hole to reveal a small passage leading to a 9-meter drop. Below, the small passage continued with many pools, through some small rooms to a sump. The cave is 45 meters long and 53 meters deep.

On the following day they were guided by Don Urbano to Caverna del Guano, a 45-minute walk from Membrillos on the route to Malhuantla. This cave is an old resurgence that is now inactive. It is very hot and has large quantities of bats and guano. Its length is 220 meters, and it ascends 26 meters above the entrance. Just below the entrance is a small cave called Ramal del Sapo.



El Gran Escurrimiento in Gruta de Malhuantla. (Carlos Lazcano)



INTO BASALT

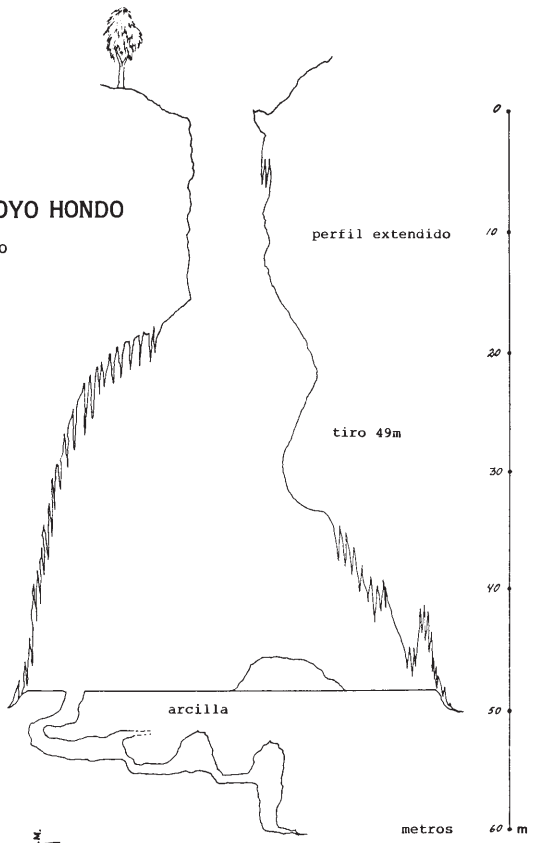
In mid-January 1985 Rodrigo Quesada, Mauricio Tapie, and Pablo Tapie returned to Membrillos, not so much for caving but for reconnaissance. At that time they located Cueva del Salto o de los Moscos, the Hoyos Escondidos, and Hoyo del Resumidero. Two of these were explored in May by Mauricio and Rodrigo, but Hoyo del Resumidero remains unexplored.

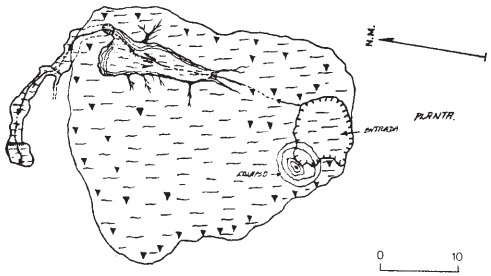
Cueva del Salto o de los Moscos is formed in 80 percent basalt and 20 percent limestone. It is situated next to the arroyo in Membrillos and is

SOTANO HOYO HONDO

TAXCO, GUERRERO

TRABAJO REALIZADO CON
SUUNTOS Y CINTA POR:
PABLO TAPIE V.
MAURICIO TAPIE V.
PABLO PEREZ-REDONDO K.
HECTOR RIVERO C.
DIBUJADO POR MAURICIO TAPIE



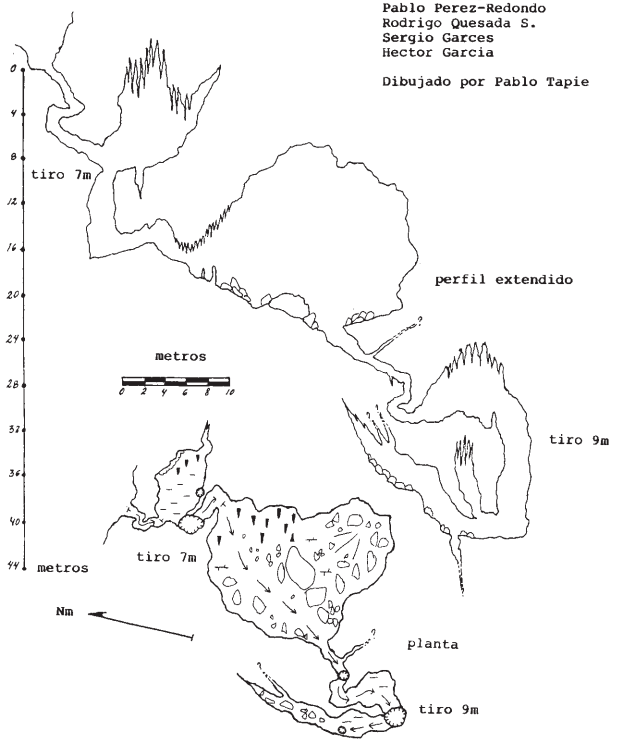


Cueva de Tescalitos

TAXCO GUERRERO

Trabajo realizado con Suuntos
y cinta noviembre 1984 por:
Pablo Tapie V.
Mauricio Tapie V.
Pablo Perez-Redondo
Rodrigo Quesada S.
Sergio Garces
Hector Garcia

Dibujado por Pablo Tapie

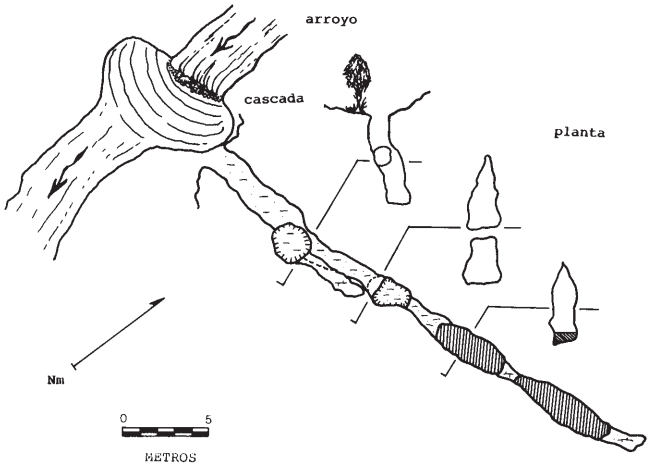


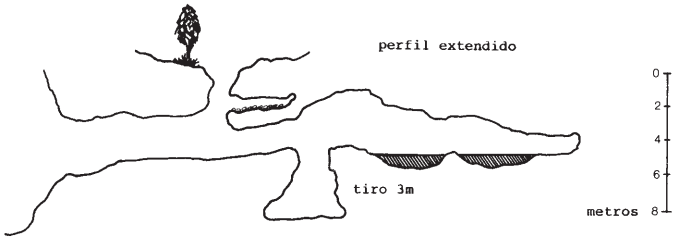
Cueva del Salto o de los Moscos

TAXCO, GUERRERO

Trabajo realizado con Suuntos
y cinta mayo 1985 por:
Mauricio Tapie V.
Pablo Tapie V.
Rodrigo Quesada S.

Dibujado por Mauricio Tapie

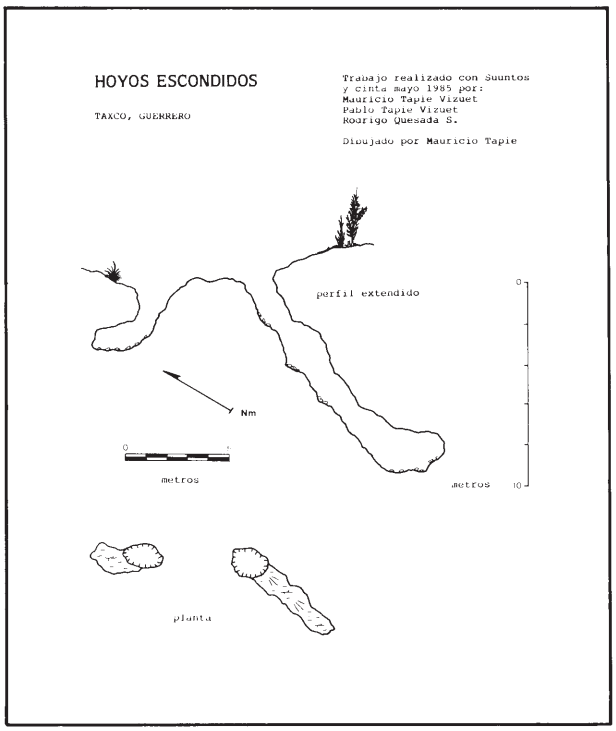


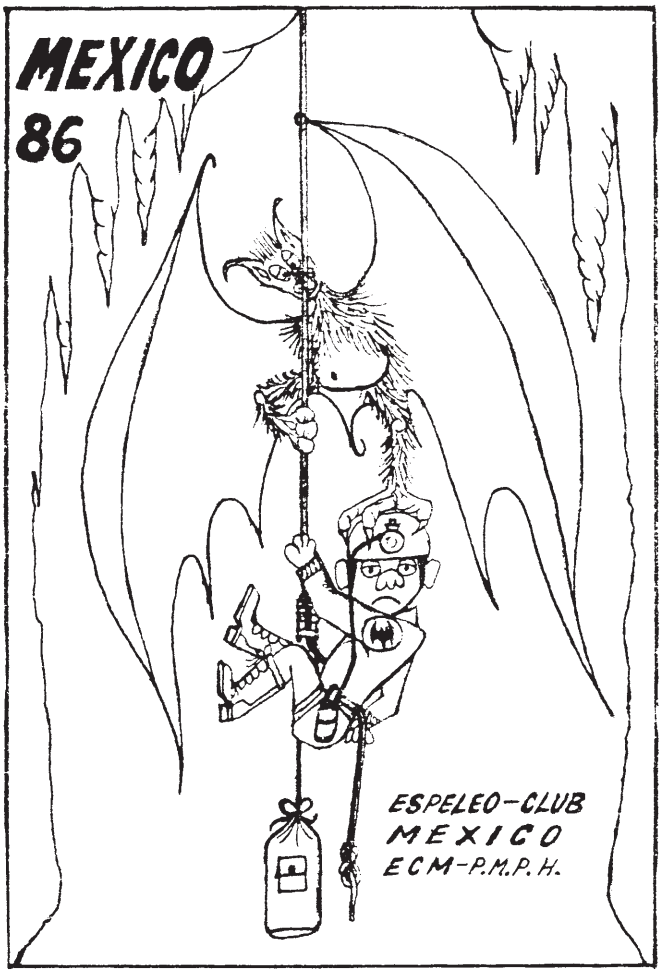


Hoyo de la Tierra Colorada

TAXCO, GUERRERO

full of mosquitos, due to the water inside. It is 25 meters long and 8 meters deep. About 500 meters from the church in Membrillos are the Hoyos Escondidos, two caves that look like they should connect but don't. The deepest is only 9 meters.





TENERIAS

Queda pendiente en la zona de Membrillos la exploración del H oyo del Resumidero. Actualmente son 10 las cuevas exploradas en la zona de Tenerias siendo Malhuantla, la gruta más larga encontrada con una longitud de 930 metros en el ramal principal. El Hoyo Hondo es el sótano mas profundo con un tiro de 47 metros y una profundidad total de 60 metros.

REVIEWS

Draco No. 4
José Montiel Castro. July, 1985,
32 pages. México, D.F.

This latest issue of Draco seems to have more information packed into it than previous issues, and the printing quality shows some improvement.

Draco cavers have continued to be active in the state of Guerrero. Over Easter 1984, they joined cavers from Escuela de Guias Alpinistas de México on a trip to search for Sótano de Papagayo. Although this pit was not located, two unnamed pits were mapped in the Papagayo area. One of these was 44 meters deep in three drops, and the other was 12 meters deep. Local residents said they knew of three more pits that were each "no less than 200 meters deep." A return trip is planned to locate these.

In February 1985, the area around Huacalpan, about 28 kilometers west of Chilpancingo, was investigated. Marcos Alfonseca, José Montiel, and Alejandro Pacheco located several caves at about 2600 meters elevation. One cave was over 800 meters long, another over 500 meters long, and both continued.

Bolt and rigging information is given for Resumidero la Joya (3245 meters long and 236 meters deep), and yet another segment of the map appears.

Draco has been conducting caving seminars in México, D.F., Chilpancingo, and Acapulco, Guerrero. Caving techniques instruction has been given to 109 persons. On 18 August 1984 various caving groups met in México, D.F. for a gathering. Participating were members of Draco, Xaman-Ek, Sociedad Mexicana de Exploraciónes Subterraneas, Escuela de Guias Alpinistas de México, and Cruz Blanca Neutral-Cuerpo de Ambulancias.

As with previous issues, Draco No. 4 deals heavily with techniques, including first aid, vertical, and biological collecting. An overview of bats of the world is presented along with an article on vampire bat extermination in México. Cave accidents in México during 1982 are listed, and the editor makes a call for the placement of registers in caving areas. The latest in a series of hand-colored geology maps shows the limestone in northern Puebla and parts of adjacent states.

Peter S. Sprouse

Note: The above publication is available from AMCS, P.O. Box 7672, Austin, Texas 78713. Write for a price list.

Letter to the Editor

Nothing sets the grapevine lunging like a good rumor. In early February word spread across the U.S. that a team of Australians, under the leadership of Alan Warild, had gone to Huautla and been turned back. They were sent to México City to obtain federal permission to conduct their expedition. They lost three weeks in red tape before gaining permission from the geographial survey office, leaving them with less than a month for exploratory work. When Warild relayed this information to the States, Mark Minton, leader of the U.S. expedition to Huautla this year, decided that they would head straight for México City and get the hassles over with prior to going to Huautla. They lost two weeks time. The consensus of these two teams was that the federal government, in a broad sweeping maneuver, had sent notification to local authorities across the country indicating that speleological expeditions were being re-classified as scientific projects, for which existing federal statutes required prior government approval and a healthy deposit, as well as a formal report following the expedition.

The federal permission route was not unknown in México, as a Polish team to Sótano de San Agustín in 1980, and an international team to the Pena Colorada resurgence which I led in 1984, had both approached the Mexican government for assistance. The contention was that the scale and visibility of the latter expedition had drawn the attention of the Mexican bureaucratic machine to the otherwise innocuous matter of expedition cave exploring, with devastating ramifications for small teams with tight budgets and short time schedules.

All of this, of course, was a simmering topic for discussion through the summer of 1985. After the earthquake of September 19, I was one of the hundreds of international rescue workers and engineers sent to México City to help with the cleanup. When the rescue operations were completed I met with Sergio Zambrano and Angel Soto, Mexican members of the Pena Colorada team in 1984. Zambrano had recently been in touch with the director of the geographical survey, Dr. Nestor Duch Gary, and had been informed that no federal regulations regarding speleological expeditions had been issued from his office, although the subject was under consideration. Zambrano proposed that caving expeditions be classified as sporting events, much like the hundreds of interna-

tional teams of mountaineers who come each year to climb México's volcanoes.

This however, did not explain the difficulties encountered by Warild's expedition. Soto and I, both fluent spanish speakers, subsequently drove to Huautla to meet with the town president. There we discovered that federal investigation agents had visited the town in January, shortly before the arrival of the Australians, and advised the officials that foreign criminals (specifically drug dealers) might be trying to hide out in the area. Not recognizing Warild as one of the "regulars" the president of Huautla felt that he could not risk clearing them without some form of identification or authorization from the Mexican government. Warild returned to México City seeking some means of being "officially" recognized and contacted Zambrano for help. Zambrano directed him to Duch Gary's office, where we had gone the previous year for vastly different reasons: to smooth the importation of seven tons of high-tech diving hardware. The truly unfortunate side of the whole affair was that Minton's team was well known in Huautla and would likely have had no problem in gaining permission locally. At the suggestion of the president of Huautla an agreement was reached that teams bearing an introductory letter from me would be granted access to the area.

The "Huautla Accord" is a short term solution to a local problem: new presidents are elected once every three years. Perhaps a new agreement will have to be reached with the next official; perhaps he will not care one way or the other. This kind of problem will continue to crop up in Mexican caving, and when confronted with it there are basically three things we can do: blame it all the the last guy to visit the area; resolve it locally through negotiation; or obtain a federal permit. I have never believed in the first option, and the third can have many benefits such as unhampered border crossings, military escort (for equipment security and local negotiations), and a spanish speaking liaison to insure that nothing interferes with the conduct of the operation. This can be an attractive option when a lot of equipment, funds, and personnel time are on the line.

Meanwhile, we should keep in mind that while we are primarily sportsmen, the information we collect in the form of survey data, photographs, and dye traces could one day constitute a precious gift to the people of México. Many villages in the mountainous karst regions are without water for several months each year. Access to precise maps of subterranean hydrologic networks might enable the government to establish community wells. Additionally, such data would be useful in helping to develop national parks to preserve exceptional cave systems. Lately the geographical survey office has begun to take notice of the awesome speleological legacy that nature has dealt México. It is thus somewhat understandable that they should desire to know more about it, and to be privy to what is being found by the dozens of foreign expeditions doing original exploration there each year. The obvious way to gather data from these teams is via the mechanism we all fear: enforced federal permission.

I believe there is an alternative to this scenario: the establishment of a National Archive of Speleology, under the auspices of the geographical survey office, to serve as a lasting repository of karst information on México for scholars and caves alike. In its best form, teams caving in México would voluntarily submit results from their explorations to such an archive following each expedition. This would be a place to keep perishable items like copies of field notes, computer line plots, large scale maps, tapes of digitized survey data and lengthy expedition logs that cannot otherwise be published in the AMCS Activities Newsletter or other journals. As I look back on 21 years of U.S. exploration in México I see two projects that nave maintained continuity in their data: Purificación and Huautla. Like Cuetzalan, and most of the original projects which were active in the 1960s, there is no guarantee that the data keepers and historians of these projects will continue to provide their undivided attention as they grow older. Eventually the hard data, and 20 years of work, will simply fade away. An archive would be a place where teams in the future could go to pick up the pieces of an an old project and carry on.

We gringos have a propensity for trying to slide in under the wire until we are forced to open the door. I believe that now is the time to open that door. With a free flow of information the threat of required permission will wither. The other alternative is to wait, and let the Mexican federal government dictate the politics of caving in México.

Bill Stone

INDEX TO CAVES AND LOCALITIES

AMCS Activities Newsletters Nos. 1 through 15

This index was compiled by Don Broussard, Bill Elliot, David Honea, Jim Pisarowicz, Peter Sprouse, and Terri Sprouse. It is admittedly a crude effort, and the accuracy, spellings and alphabetizing are variable. Maps are denoted by an asterisk (*).