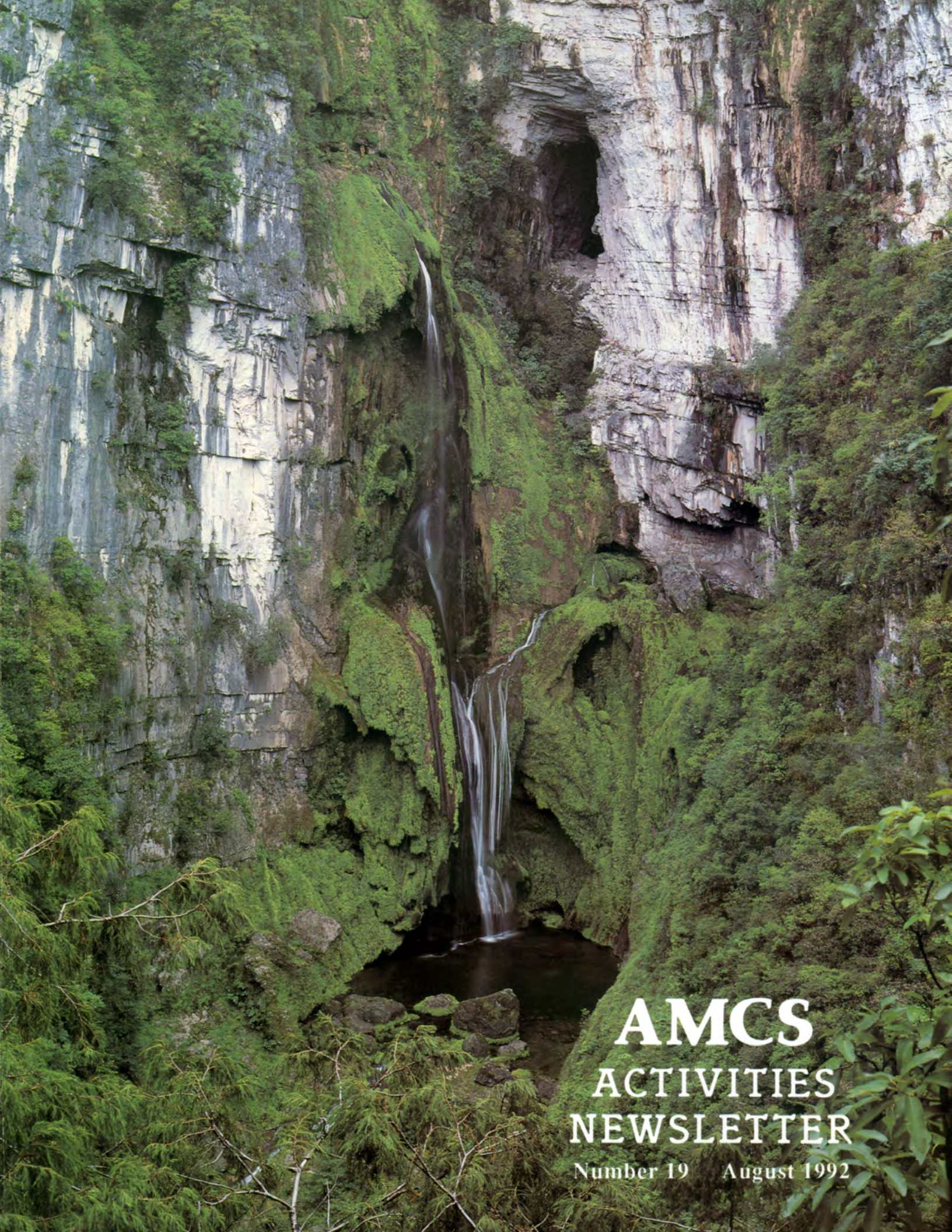

AMCS
ACTIVITIES NEWSLETTER

Number 19 August 1992

AMCS

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Number 19 **August 1992**

The *AMCS Activities Newsletter* is published by the Association for Mexican Cave Studies, with assistance from William Russell. This issue was edited by Bill Mixon, with help from Katie Arens, Jeff Horowitz, Susie Lasko, Mark Minton, Peter Sprouse, and Alex Villagómez.

This issue is thinner than the last few, which reflects a determination to return to a regular annual schedule. The *Activities Newsletter* seeks articles and news items on all significant exploration and research activities in the caves of Mexico. Photographs suitable for the covers and other full-page applications are also sought. They need not relate to an article in the issue, but the original slide or negative must be available on request for printing full-page photos. The AMCS would like to receive copies of all published information about caves and caving in Mexico, including reports of "tourist" trips, for an annual bibliography that we hope to start publishing in the next issue. All material may be sent to the AMCS address. Those planning an article may contact the AMCS for the name of the editor and the schedule for the next issue. Better yet, just send it now.

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

ASSOCIATION FOR MEXICAN CAVE STUDIES
BOX 7672
AUSTIN, TEXAS 78713

Front cover

The spectacular entrance to Cueva Paraíso Difícil, Tamaulipas, half way down a cliff two hundred meters high.
Photo by Terry Gregston.

Back cover

Forty-nine flashes in the Fantasia Borehole, Cueva del Tecolote, Tamaulipas.
Photo by Susie Lasko.

Frontispiece

Dave Barlow ascending the second pitch in the Wet Route in Xongo Dwi'ñi, Oaxaca, during flood.
Photo by Alan Warild.

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Stan Allison in Cueva Palomitas, Oaxaca.
Photo by Peter Bosted.

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Above the fifth drop in Pozo de Montemayor, Nuevo León.
Photo by Peter Sprouse.

CONTENTS


NEWS

MEXICO NEWS

Compiled by Mark Minton

CHIAPAS

After spending some time in northern Guatemala, in the Cuchumantanes, a two-person Dutch team returned to the Comalapa, Chiapas, area to continue prospecting for good leads. This time they checked the opposite side of the mountain from where their previous expedition had looked. (See *AMCS Activities Newsletter* 16). Near El Progreso, at 2500 meters elevation, two promising caves were found, but could not be checked for lack of vertical gear. One appeared to be 60 to 80 meters deep. At Tres Maravillas, **Cueva de Amaca** was a small labyrinth 75 meters long with four entrances, one used as a trash dump. Higher in the mountains, a large resurgence, **Cueva Larca** (or **Cueva de Larco**), was explored for 175 meters through four duck-unders. They stopped at a fifth duck under 5 meters long. Another short resurgence cave was located about 100 meters higher. Villagers use these caves for their water supply. Several other leads were obtained from local people, but time ran out before they could be checked. *Source:* Suzanne Abbenhuis, Laurens Smet, *Speleo Nederland/Pierk*, September 1991.

CHIHUAHUA

West Texas cavers have been exploring **Cueva de Tres Marías** in the northeastern portion of the state. It was located in 1989 by Terry Bolger and Bill Greenley and has been visited once or twice a year ever since. The 18-meter handline entrance drop led to a blowing dig, which was opened up to reveal a horizontal maze. Over two kilometers have been surveyed to date. The cave contains interesting mineral deposits, including gypsum and uranium-containing clays. Radiation concerns have slowed progress recently. Also in the area is **Cueva de Carranza**, a very hot maze cave, surveyed to 300 meters long, that also contains interesting gypsum deposits. *Source:* Jerry Atkinson.

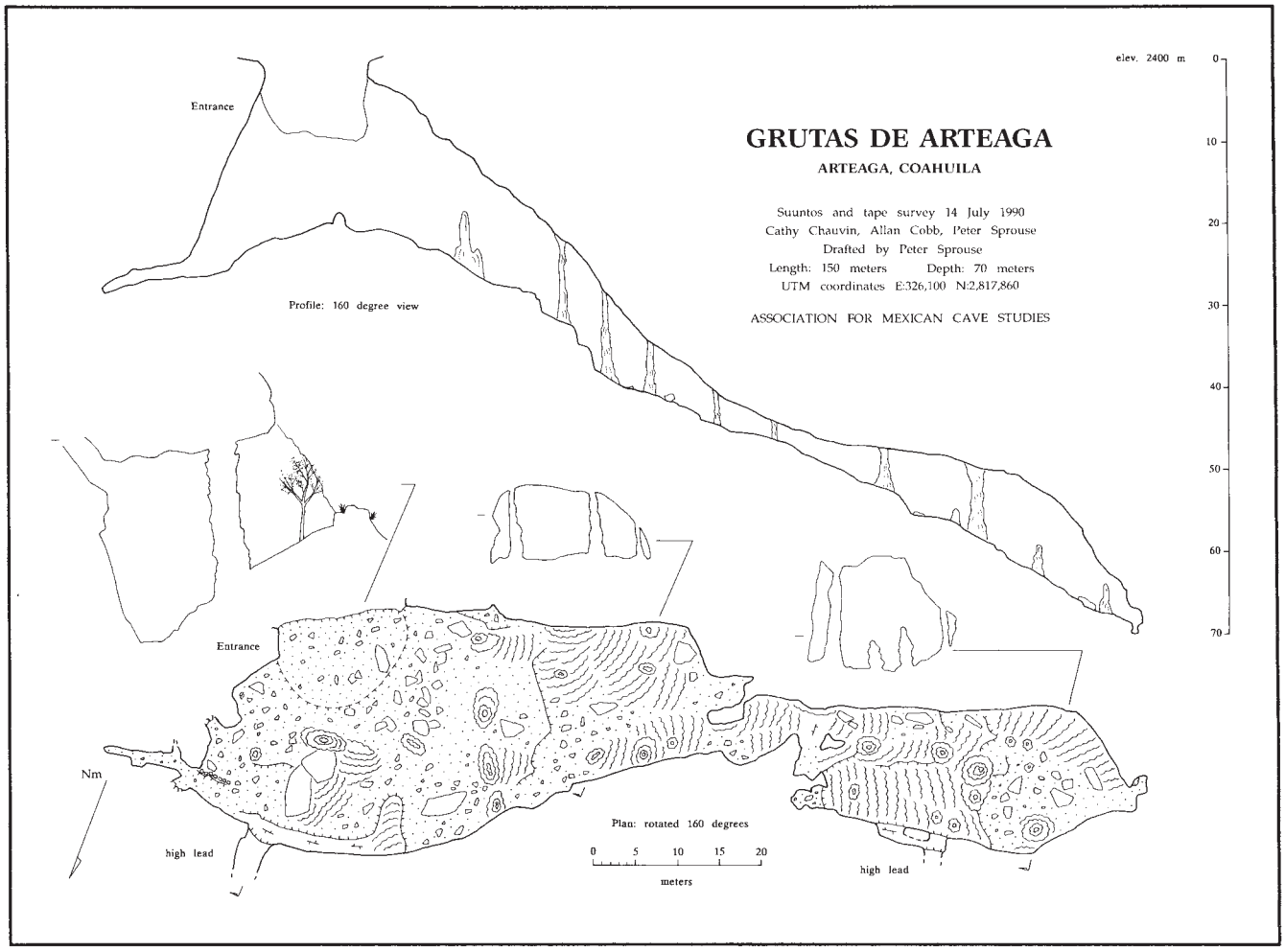
COAHUILA

Austin cavers searched for leads in the Sierra Coahuilón in July 1990, but found only disappointingly small holes. They moved on to Arteaga, where they rediscovered **El Volcán**, a pit that was not entered. Farther up the hill, they surveyed **Grutas de Arteaga**, which contains some large columns in a sloping room. *Source:* Peter Sprouse.

Mexican cavers of Espeleo-ITESM explored seven caves near La Siberia. Six were small, but one was a four-drop cave estimated to be 112 meters deep. Although the entrance was very small and the locals claimed no one had been there before, they found beer cans and chip bags from the United States inside. *Source:* Francisco Hernández Mijares.

In spring 1992, Texas cavers returned to El Nacimiento, a Kickapoo Indian vil-

"Matilda," found near Pozo Sin Aire, Colima.



lage near Múzquiz, after an initial visit a few years earlier had indicated the area may have potential. A local guide led them through serious thorn forest to a few small caves and pits, but couldn't find the "big one" he said he knew was there. The cavers gave him some flagging tape and plan to return after the winter cold exposes the big cave by its steam plume. *Source:* Bill Steele.

COLIMA

Gruta de Tampumachay is a commercial cave south of Colima City without the usual tourist amenities. One must bring his own light, and a helmet doesn't hurt. The entrance is only 0.6 meters high, and the path through the cave involves duck-walking and climbing over huge breakdown blocks into a large room. Bats and vinegarroons adorn the passageways. During the nightly bat flight, a boa constrictor has been spotted hanging from the ceiling of the entrance, catching bats. A survey is in progress by Espeleoclub ZOTZ. *Source:* John Pint.

A local SEDUE official showed ZOTZ cavers a new karst area along the Coahuayana River near the Pacific coast. In **Pozo Sin Aire,** they were turned back by bad air after two drops to a total depth of 30 meters. The CO_2 barrier could be pinpointed using a butane lighter. Archaeological artifacts were found near the cave, including a small figurine they named Matilda. Nearby, a well-decorated horizontal cave called **Cueva del Coliflor** was found. Local reports suggest further discoveries await future explorers. *Source:* John Pint.

DISTRITO FEDERAL

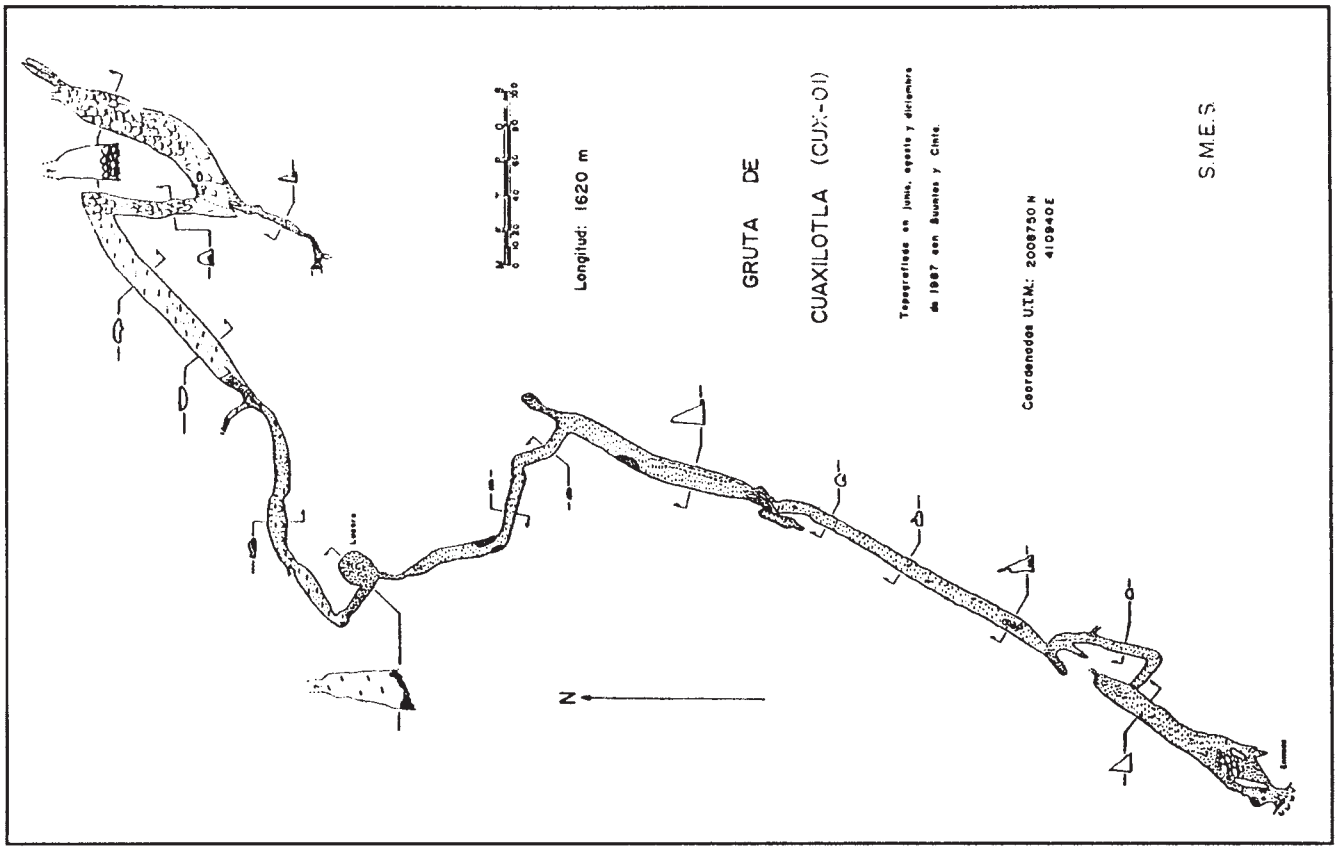
Sociedad Mexicana de Exploraciones Subterráneas cavers have explored a complex lava cave west of Colegio de México. **Gruta de los Huesitos** is 1347 meters long, with leads remaining. It is the longest cave in the D. F. and one of the longest and most complicated lava caves in Mexico. *Source:* Ramón Espinasa, *Tepeyollotli*, no. 4, September 1989.

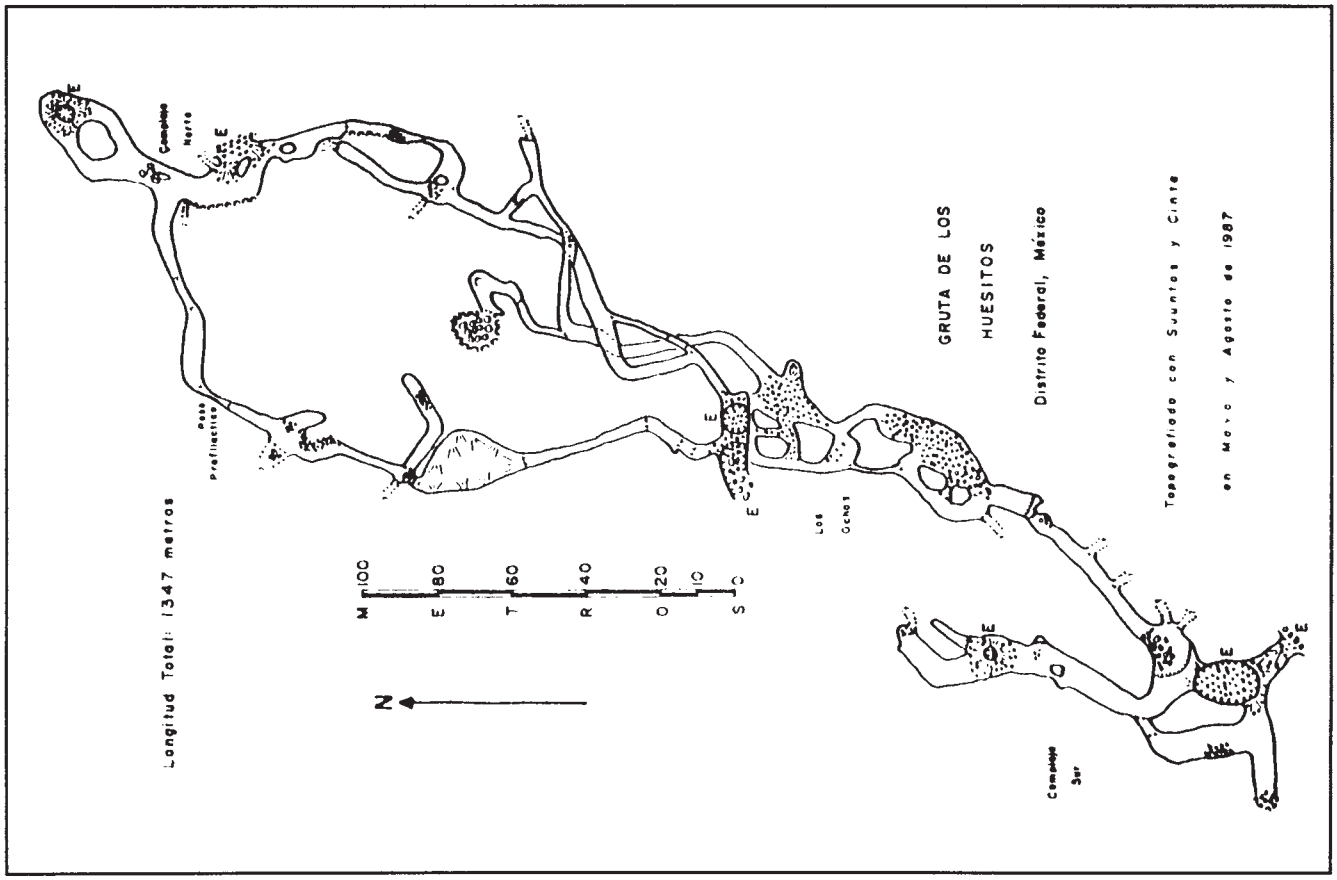
DURANGO

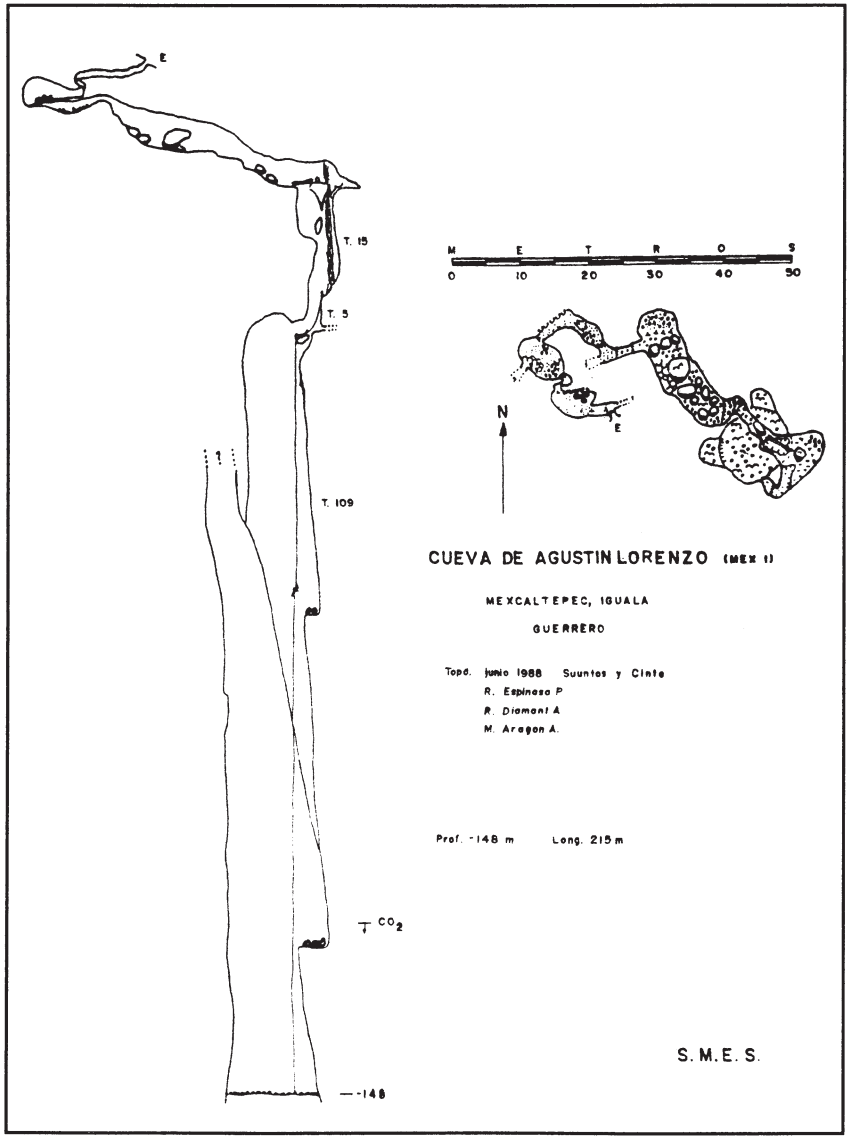
Mexican judicial police have been searching for about thirty victims of a satanic cult who were sacrificed to protect marijuana-growing operations on the Durango-Nayarit border. No bodies had been found, but a dagger and blood stains were found in caves on Horse Hill, near Santa María. Texas cavers were in this area on their way back from a trip to view the solar eclipse in July 1991, but heard nothing of the incident. However, they were surprised by and curious about the large number of airstrips shown on the topo maps of these remote mountains. *Source: Austin American-Statesman,* Thursday, July 26, 1990.

GUERRERO

SMES cavers have continued their explorations in the Chilacachapa mountain range. Seventeen caves have been explored, including **Gruta de Aclalá,** 1744 meters long, and **Gruta de Cuaxilotla,** 1620 meters long. **Hoyo de la Tía Cuala**


GRUTA DE
CUAXILOTLA (CUX-01)
Longitud: 1620 m
Topografiada en junio, agosto y diciembre
de 1987 con Suuntos y Cinta.
Coordenadas U.T.M.: 2008750 N
410940 E
S.M.E.S.
N


GRUTA DE LOS
HUESITOS
Distrito Federal, México
Topografiada con Suuntos y Cinta
en Mayo y Agosto de 1987
Longitud Total: 1347 metros
Campamento Norte
Pozo Profiláctico
Los Ocho
Campamento Sur
METROS
N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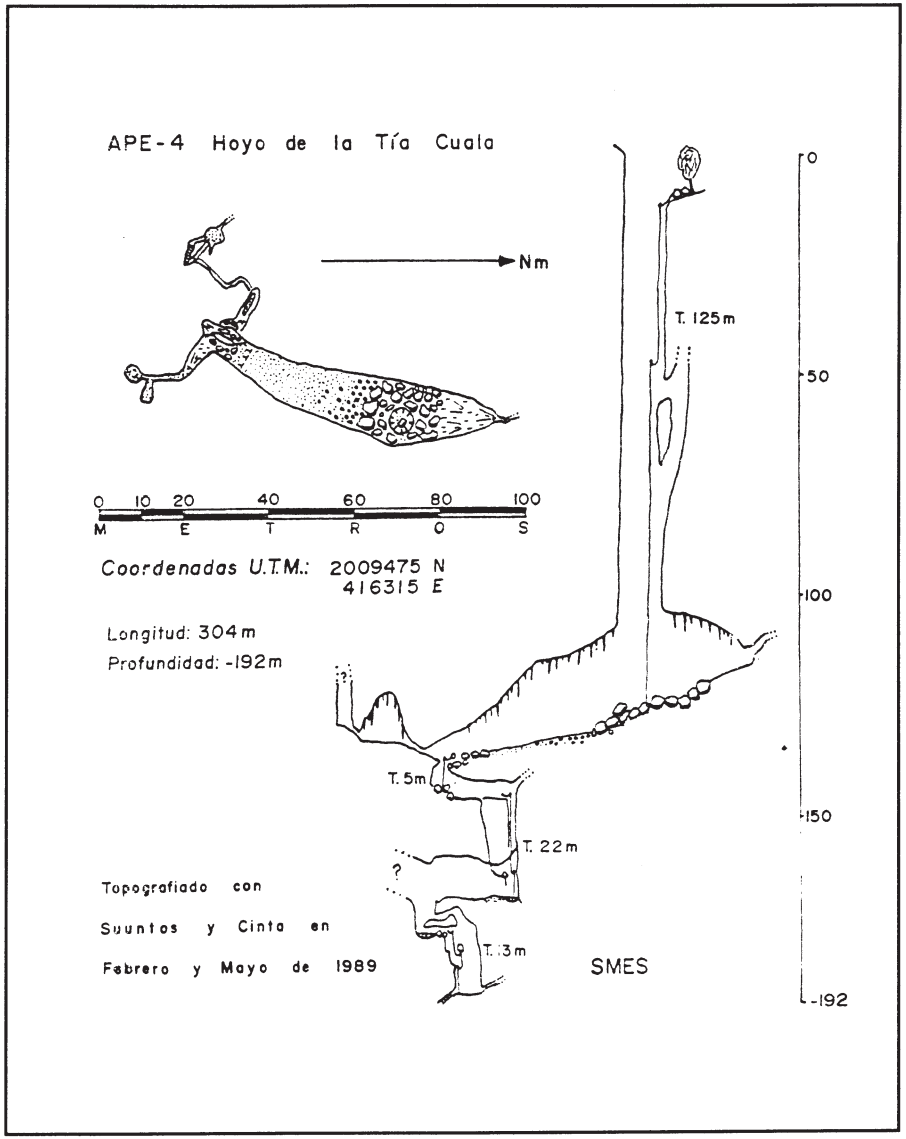
T. 15
T. 5
T. 109
T^{CO_2}
-148
M E T R O S
0 10 20 30 40 50
N
E
CUEVA DE AGUSTIN LORENZO (MEX 1)
MEXCALTEPEC, IGUALA
GUERRERO
Topd. Junio 1988 Suuntos y Cinta
R. Espinoza P.
R. Diamant A.
M. Aragon A.
Prof. -148 m Long. 215 m
S.M.E.S.


APE-4 Hoyo de la Tía Cuala
Nm
0 10 20 40 60 80 100
M E T R O S
Coordenadas U.T.M.: 2009475 N
416315 E
Longitud: 304 m
Profundidad: -192m
T. 125m
T. 5m
T. 22m
T. 13m
Topografiado con
Suuntos y Cinta en
Febrero y Mayo de 1989
SMES
0
50
100
150
-192

contains the longest drop in the state, 125 meters. The deepest cave, **Resumidero del Platanar**, is still going in borehole at -212 meters. *Source:* Ramón Espinasa and Ruth Diamant, *Tepeyollotli* no. 4, September 1989.

Cueva de Agustín Lorenzo in the Iguala valley is formed in an unusual fault breccia. It begins as a narrow passage that drops down 15- and 5-meter pitches to the final drop of 109 meters. High CO_2 levels were encountered near the bottom. *Source:* Manuel de J. Aragón Arreola, *Tepeyollotli* no. 4, September 1989.

SMES cavers have explored **Resumidero del Izote**, 1649 meters long and 197 meters deep, and **Cueva de Las Pozas Azules**, 1399 meters long and +52 meters "deep," to sumps that are less than 30 meters apart. A dive to connect them would yield a system 3 kilometers long and 250 meters deep. *Source:* Ramón Espinasa, *Tepeyollotli* no. 4, September 1989.

HIDALGO

While attempting a through trip in **Grutas de Tolantongo** (see *AMCS Activities Newsletter* 17), a Mexican Boy Scout was swept away at the bottom of the first drop. His teammates routed, and the body was not recovered. *Source:* Ramón Espinasa.

JALISCO

Espeleoclub ZOTZ cavers visited a volcanic cave, **La Cueva Cuata**, near Tequila, which is used as a shrine. Rumors of a secret "deathtrap" that ejected people out through a cliff below the entrance proved unfounded. Two passages were surveyed, both ending in water. *Source:* John Pint, *Subterráneo* no. 6, May 1990.

ZOTZ cavers also explored **La Cueva Chiquiliche** near Chiquilistlán. The well-decorated cave contained three routes, one of which connected with another entrance. *Source:* Juan Blake B., *Subterráneo* no. 6, May 1990.

MICHOACÁN

ZOTZ cavers Claudio Chilomer and John Pint were driving along the coast on their way to Chiapas, when they rounded a curve and a crazed gunman leaped from the bushes and took aim at their car. The cavers ducked and sped on, but a bullet pierced the door and struck John in the leg. They hurried to the nearest hospital, where John was informed that the bullet could be left in his leg as a souvenir. The police informed them that such attacks were not all that uncommon. They never got to Chiapas, and John still has his souvenir. *Source: Subterráneo* no. 6, May 1990.

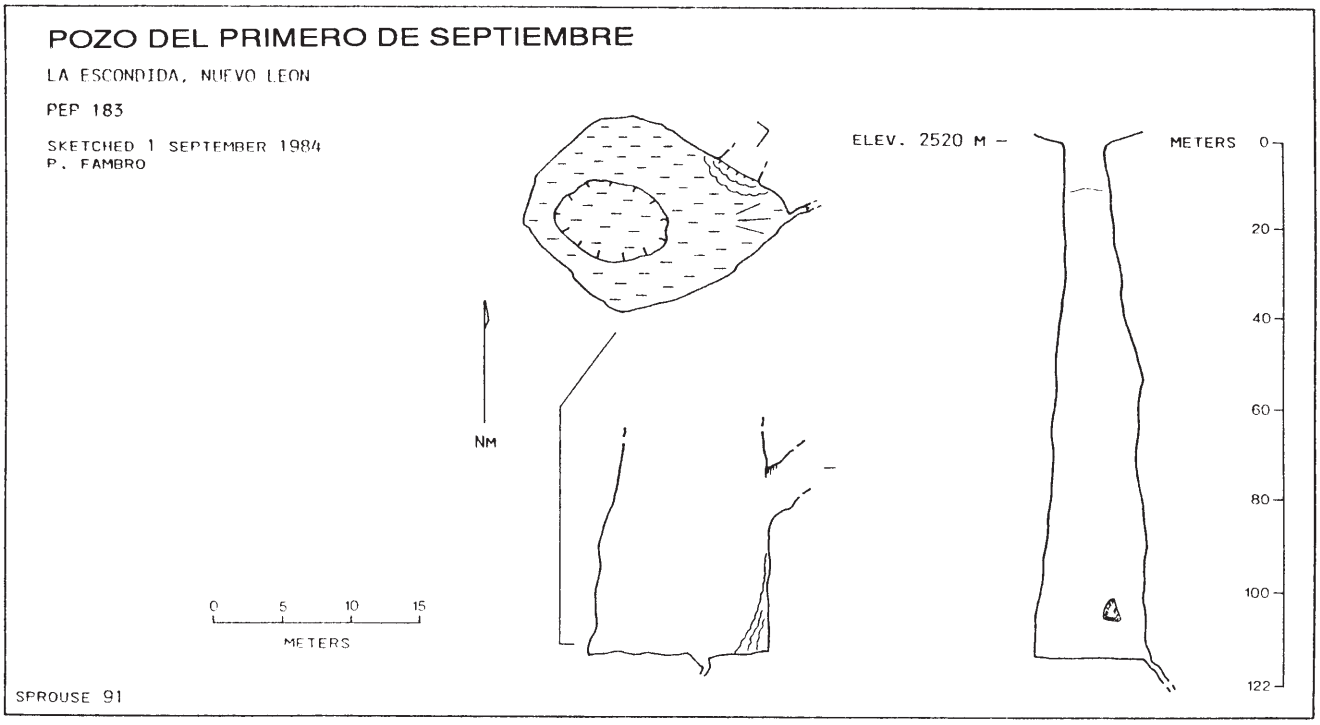
MORELOS

Sociedad Mexicana de Exploraciones Subterráneas cavers have mapped **Cueva de San Juan Tepoztlán** near Cuernavaca to a length of 2056 meters. This lava tube was previously mapped by José Palacios-Varga and a biospeleology class to 448 meters. Several other large entrances farther up the lava slope could connect in. *Source:* Ramón Espinasa.

NUEVA LEÓN

Exploration in 500-meter-deep **Pozo de Montemayor** at Minas Viejas has continued. See article in this issue. Several new caves and pits have also been found in the surrounding karst. Meanwhile a systematic survey of the large **Buena Vista Mine** has been undertaken. This is a vast three-dimensional complex of tunnels that runs completely through the mountain. Many natural cave passages have been intersected, some of which have proven to be significant in their own right. To date approximately eight kilometers have been mapped, which just scratches the surface. Access to this part of northern Mexico is greatly facilitated by using the new Solidarity bridge west of Laredo. The roads are good, and there are no lines to wait in. *Source:* Joe Ivy, Mark Minton.

Several small caves in the Bustamante area have been explored by Texas cavers



in recent years. On the high mesa above Minas Viejas, **Pozo la Gloria, Spiderman Pit, Pozo No Go,** and **Pozo Sin Relampago** were all less than 30 meters deep. West of Bustamante, an isolated gypsum karst produced **Antler Cave,** which had deer-antler petroglyphs, **Cueva de Las Ventanas,** and **Cueva de Centavita.** Interesting biological collections were made in several of these caves. *Source:* Peter Sprouse, *Texas Caver,* August 1989.

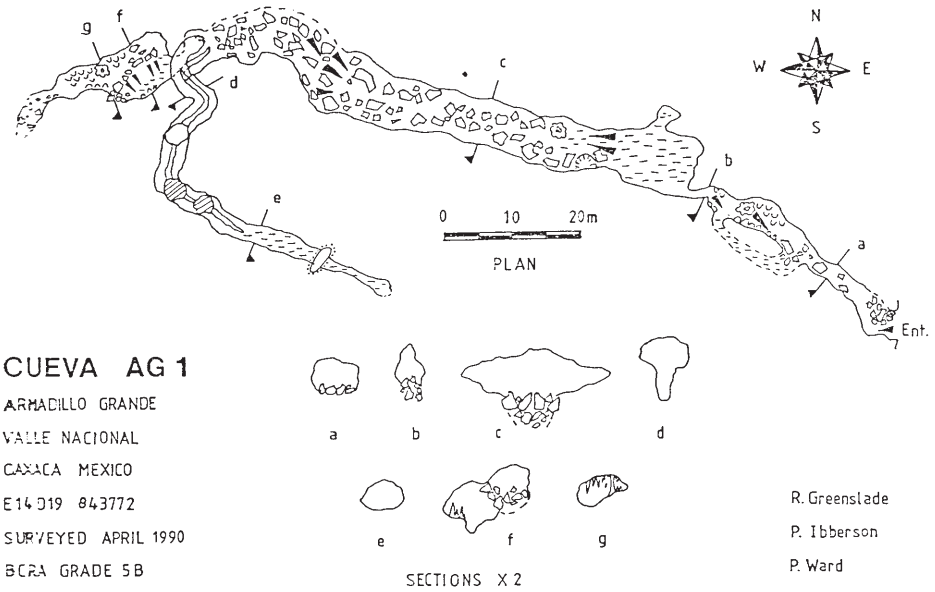
An extensive history of exploration and descriptions of caves around Cerro El Viejo near Zaragoza is given in the new PEP publication, *The Death Coral Caver.* (See also *AMCS Activities Newsletter* 17.) The longest cave found to date is **Cueva de la Forja No. 1,** 326 meters, while the deepest is **Pozo del Primero de Septiembre,** -122 meters. Shale beds seem to limit cave development in this area. *Source: Death Coral Caver* no. 1, October 1991.

Michael Crawford, Susie Lasko, and Peter Sprouse returned to the Zaragoza area over Memorial Day, 1992. Nine more blind pits were found, ranging in depth from 7 to 64 meters. Two small caves were also discovered. *Source:* Peter Sprouse.

OAXACA

Six cavers from the United States and Mexico staged a preliminary rigging trip to **Cueva Cheve** in December 1991. Then in late January 1992, a large international group of forty-two cavers from the United States, Mexico, and Poland went to the cave. Their goal was to recover the body of Indiana caver Chris Yeager who had fallen to his death a year earlier and had been buried at a site 730 meters deep and several kilometers distant into the cave. (See article on Sierra Juarez in this issue.) The original expedition had considered a body recovery to be too hazardous, but, with the expertise of the Polish to guide them, this team succeeded without any serious problems. The entire operation was concluded in two weeks. *Source:* David Anderson, *Windy City Speleonews,* April 1992, Lillian Novela, *Foresight,* Winter 1991, Bill Steele, *Texas Caver,* June, 1991.

British cavers Richard Greenslade, Paul Ibberson, and Peter Ward explored several small caves and pits in the Valle Nacional area during March and April, 1990. The largest, **AG1,** was 219 meters long and contained a large gallery and

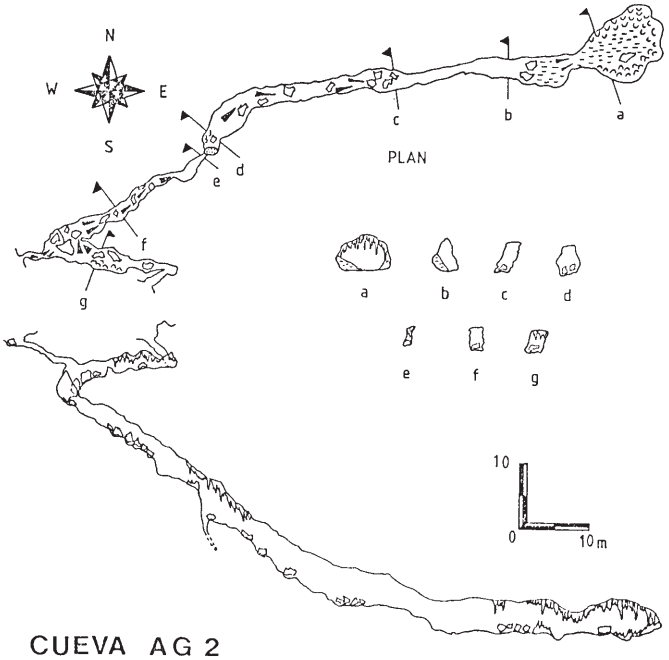


CUEVA AG 1

ARMADILLO GRANDE
VALLE NACIONAL
OAXACA MEXICO
E14 019 843772
SURVEYED APRIL 1990
BCRA GRADE 5B

SECTIONS X 2

R. Greenslade
P. Ibberson
P. Ward

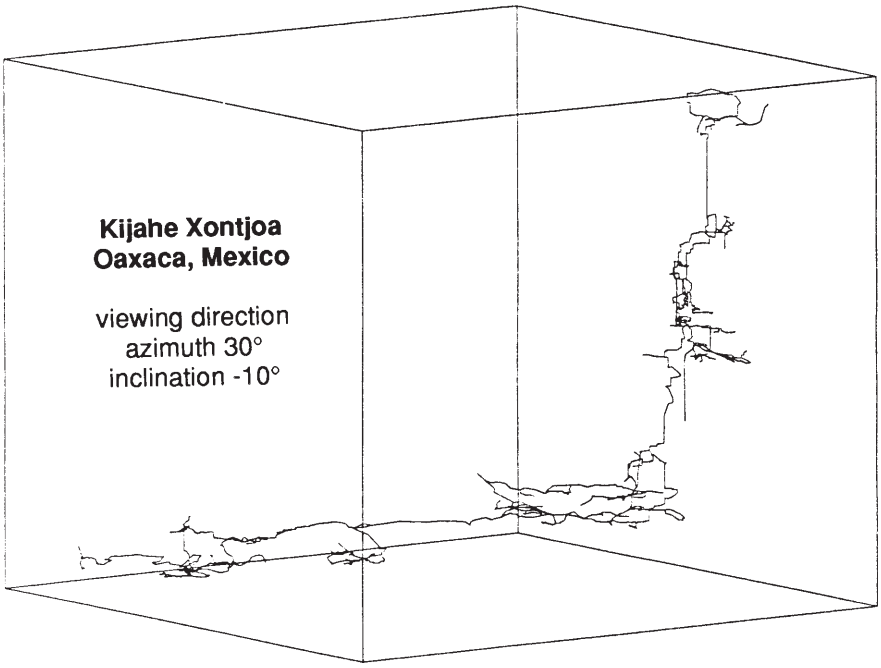


CUEVA AG 2

ARMADILLO GRANDE
VALLE NACIONAL
OAXACA MEXICO
E14 019 055762
SURVEYED APRIL 1990
BCRA GRADE 5B

PROJECTED ELEVATION

R. Greenslade
P. Ibberson
P. Ward



lower stream passage. Nearby **AG2**, 129 meters long and 44 meters deep, contained human remains and artifacts. *Source:* Paul Ibberson.

On January 3, 1991, the **Cueva Cheve** system was established as the deepest cave in Mexico, at -1365 meters. From its discovery in 1986 through the 1990 expedition, cavers had added depth to the cave not only by pushing the bottom, but also by connecting in higher entrances. The twin entrances to **Cuates** were found by Andy Grubbs, Bill Farr, and Tim Jones during the March 1988 trip. Mark Minton then discovered a higher entrance, **Escondido**, on the back side of the ridge containing Cuates. With Mark and Carol Vesely leading multiple trips, Escondido was quickly connected to Cuates, forming a system over a kilometer in length. On one of the last trips of 1990, Mark, Carol, and Herb Laegar discovered a deep shaft almost wthin sight of daylight. Returning with Bill Farr the next day, the group surveyed down Herb's Magnificent Pit, reaching the bottom after 105 meters. The cave continued, with a strong draft, down a tight, popcorn-coated canyon with a small stream, until the passage became too tight. A line plot of the map revealed that the end of the canyon below the pit was at the same level and only about 20 meters away from a crawlway at the bottom of Mondo Pit in **Osto de Puente Natural**, already part of the deep system.

During the Christmas 1990 trip, Bill went to Puente to recheck the crawl at the base of Mondo Pit. He was amazed to hear a thundering waterfall entering the pit just below the lip. By using a few chocks, wire loops, and slings, he achieved a secure and dry descent. He followed the crawlway at the bottom for about 20 meters to a pool with a slot above it that was just a little too tight to squeeze through. Digging in the sand floor yielded a couple of inches of air-space under some flowstone-coated breakdown, where Bill could see up into a larger space that looked similar to the end of the survey in Cuates-Escondido.

A week later, Carol and Bill entered Cuates-Escondido and found the route down Herb's Magnificent Pit was also in the middle of a waterfall. Again, a relatively dry descent was rigged, bypassing the lower bolts previously used as rebelays. At the end of the fissure, Carol noticed a slightly wider spot about a meter above the floor that was blocked mainly by a single flowstone-encrusted rock. For four hours they alternated among various methods of passage enlargement, including removing the rock and chipping away at the walls with a hammer. Eventually, after the slot had been widened 2 to 3 centimeters for about a meter, Bill slipped through.

The connection added about 25 meters of depth to the system. But it was the combined efforts of all the cavers in the project that made the Cheve system (also known as **Sistema Cuicateco**) the deepest cave in the Western Hemisphere. *Source:* Bill Farr and Carol Vesely.

Six Swiss and one U. S. caver returned to Cerro Rabón (see *AMCS Activities Newsletter* 18) in the spring of 1992. They pushed **Kijahe Xontjoa** to a length of 13.5 kilometers, with no change in depth (1160 meters). The new passages were all explored from a deep camp at the -1000-meter level, and many strongly drafting leads remain. A major flood from three days of rain kept them trapped in camp for two days while they waited for water levels in the lower shafts to subside. A new entrance, **P17**, found last year but not descended, turned out to be a spectacular 209-meter drop to a large, blowing passage. It is close to Xontjoa, and a connection seems likely. Several other new entrances were found, as were new archaeological sites. At the base of the mountain, a major resurgence was located at the Presa Miguel Alemán. A large return expedition is planned for March 1993. *Source:* Karlin Meyers.

At **Grutas de Apoala** in December 1990, local residents spoke of Mexican and U. S. cavers pushing the terminal sump. No other information is available at this time. *Source:* John Ganter.

A 1988 British expedition explored several caves near the Presa Miguel Alemán and the remote town of San Felipe Usila. See article on the Black Holes Expedition in this issue and the expedition report in its bibliography.

SMES cavers checked the area around Flor Batavia, east of **Sistema Cheve**, in April 1992. It is now possible to take a boat into the remote Usila area on the new reservoir. They found several minor caves, a pit 200 meters wide and 100 meters deep, and two promising sumidero entrances. *Source:* Ramón Espinasa.

PUEBLA

Attempts by Canadian cavers of Mexpé 4 to increase the depth of **Nesfastla de Nieva (TP4-13**; see *AMCS Activities Newsletter* 18) were largely unsuccessful. Although an addition 2.6 kilometers of passage were explored, to a total length of about 8 kilometers, the depth increased to only 778 meters from 732 meters. Leads

remain, however. **Vía Lactea** became complexly branched, and many infeeders in **Sistema de Angel** were greatly extended. A significant new cave called **Las Brumas** was also discovered. Considerable biospeleological finds were made, in contrast to past trips. At the resurgence level of the Sierra Negra, two caves, each over a kilometer long, were found. One was dry and full of formations, while the other carried a strong stream and ended at a constricted waterfall. Some time was also spent on the high plateau, at elevations up to 2200 meters. *Source: Sous Terre,* Spring 1991.

A three-week Mexican expedition to Cuetzalan in December 1991 surveyed 17 kilometers of passage, mostly resurvey, but including 2 to 3 kilometers in new caves. A low-airspace lead at the bottom of **Grutas de Tasalolpan** (see *AMCS Activities Newsletter* 10) led to a 20-meter-wide passage heading toward **Atepolihuit de San Miguel**. A higher, fossil passage continued as well. New leads were also found in **Resistol** and **Chichicasapan**. *Source:* Ramón Espinasa.

The British Black Holes expedition of 1988 explored 7800-meter-long **Cueva Yohualapa** near Tlacotepec de Díaz. See the article on the expedition in this issue.

SMES cavers have had several trips to **Sótano de Tapoztotl** near Tlacotepec de Díaz. After establishing a bivouac at -250 meters, they reached a depth of 335 meters, with the cave continuing. *Source:* Pablo and Mauricio Tapie, *Tepeyollotli* no. 4, September 1989.

Grupo Espeleológico Universitario cavers from UNAM have also been active in the Sierra Negra, near Tlacotepec de Díaz (Iztaxochitla), as well as around Cerro Tzinzintepetl. They have located thrity-five caves, including one 300 meters deep and another with a free drop of 120 meters. Also, a small system has been found that has eight entrances in an area of one square kilometer. A large expedition was planned for spring 1992. This is probably the same group that was reported to have found a two-kilometer-long cave on the west side of Tzinzintepetl. *Source*: Francisco Ruiz Benjumeda and Ramón Espinasa.

QUERÉTARO

After a visit to **El Sótano** in November 1991, a large entrance on the opposite side of the Río Ayutla was seen from the road to Santa María de los Cocos. (This road reduces hiking time to the pit to 2.5 hours.) Don Broussard made an unsuccessful attempt to reach the opening in December. In April 1992, Charlie Savvas and Glen Schneider completed the six-hour hike, accompanied by a guide from Ayutla. After a 50-meter scramble up a steep breakdown slope covered with brush, they reached the 60-meter-wide, 70-meter-high entrance to **Cueva de Armitallo**. Unfortunately, it was only a shelter extending about 90 meters back into the mountain. There were pottery fragments on the floor, and, according to their guide, the cave had been occupied about 150 years ago by an Indian named Armitallo. He also told them that people hid in the cave to avoid soldiers during the revolution in the early 1900s. *Source:* Glen Schneider, Don Broussard.

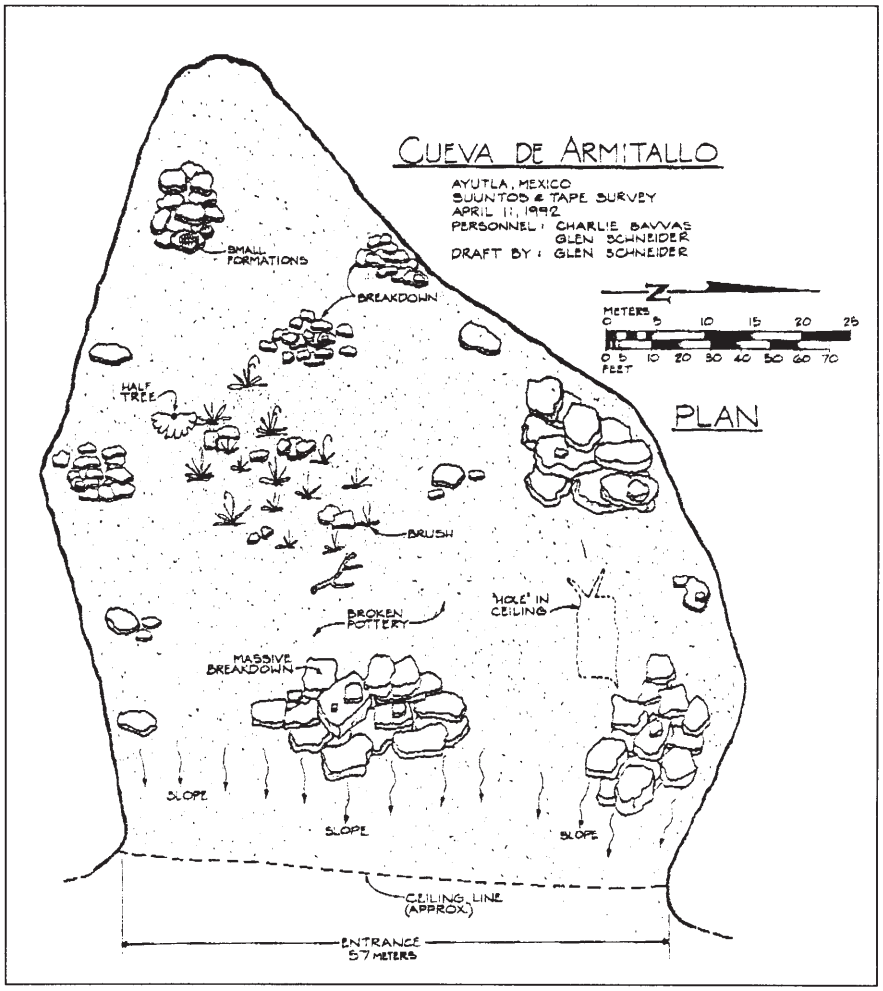
QUINTANA ROO

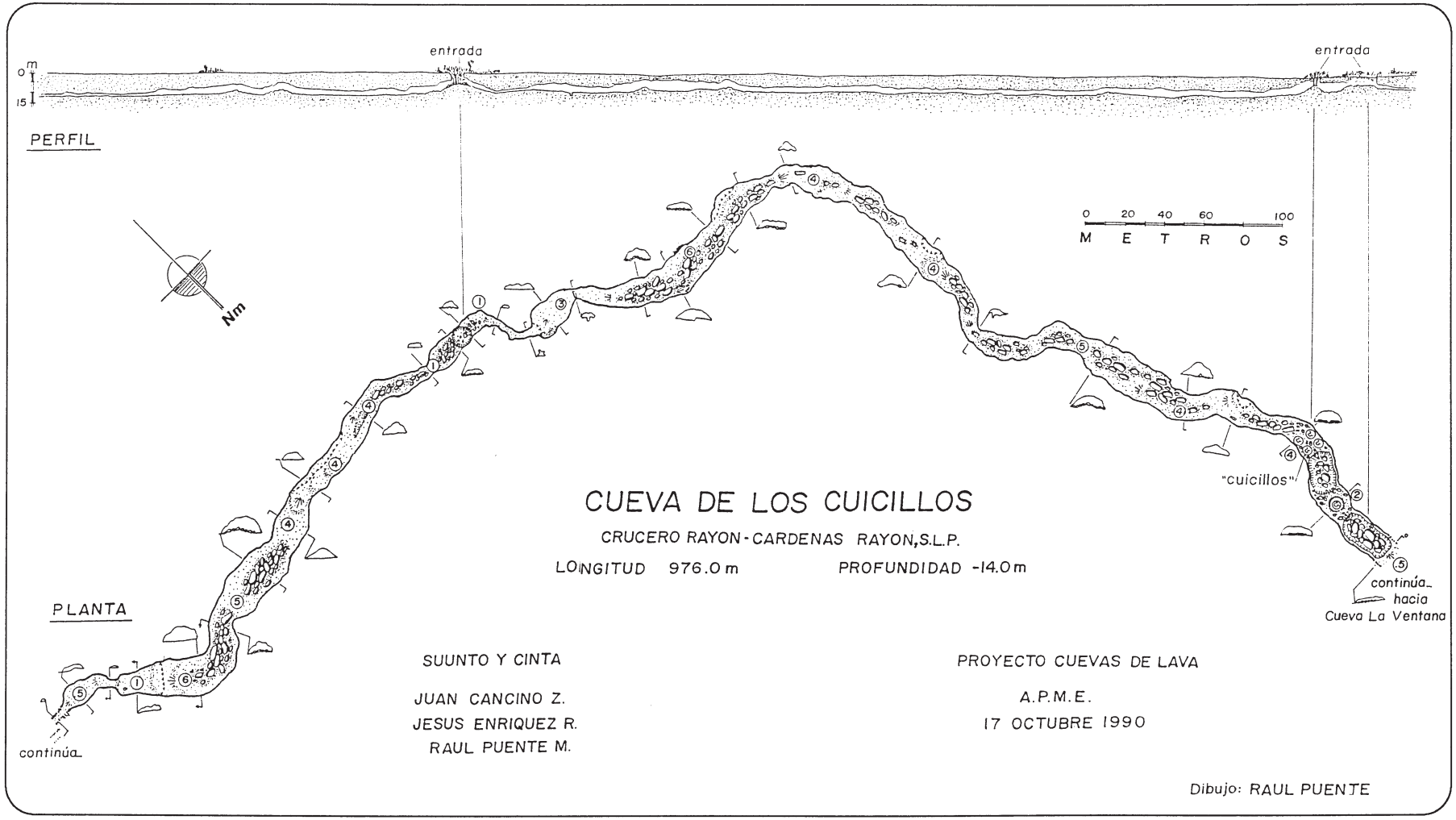
Continued diving in **Cenotes Naharón** and **Maya Blue**, which together make up **Sistema Naranjal** (see *AMCS Activities Newsletter* 18), by Jim Coke and the Quintana Roo Speleological Survey has increased the surveyed length to 15,850 meters. This makes it the longest underwater cave in the world, surpassing Florida's **Leon Sinks Cave System**, 14,860 meters. *Source: Underwater Speleology,* September-October 1991, and Jim Coke.

Cenote Zapote (or **Toucha-Ha**, monkey water in Mayan) has been surveyed to a length of 4300 meters, while **Cenote Carwash** (*AMCS Activities Newsletter* 16), 2590 meters, has been essentially finished. Both of these caves are underwater and require scuba gear to explore. *Source:* Jim Coke.

SAN LUIS POTOSÍ

Cavers of the Asociación Potosina de Montañismo y Espeleología continue with their Proyecto Espeleológico Sierra de Alvarez, the systematic exploration of the San Francisco area. (See "Mexico News" and article on Resumidero El Borbollón, *AMCS Activities Newsletter* 18.) So far, they have explored and surveyed 164 new caves. The latest finds include **Sótano del Aire**, with a 233-meter entrance pit followed by a 39-meter drop, for a total depth of 287 meters, **Sótano de**

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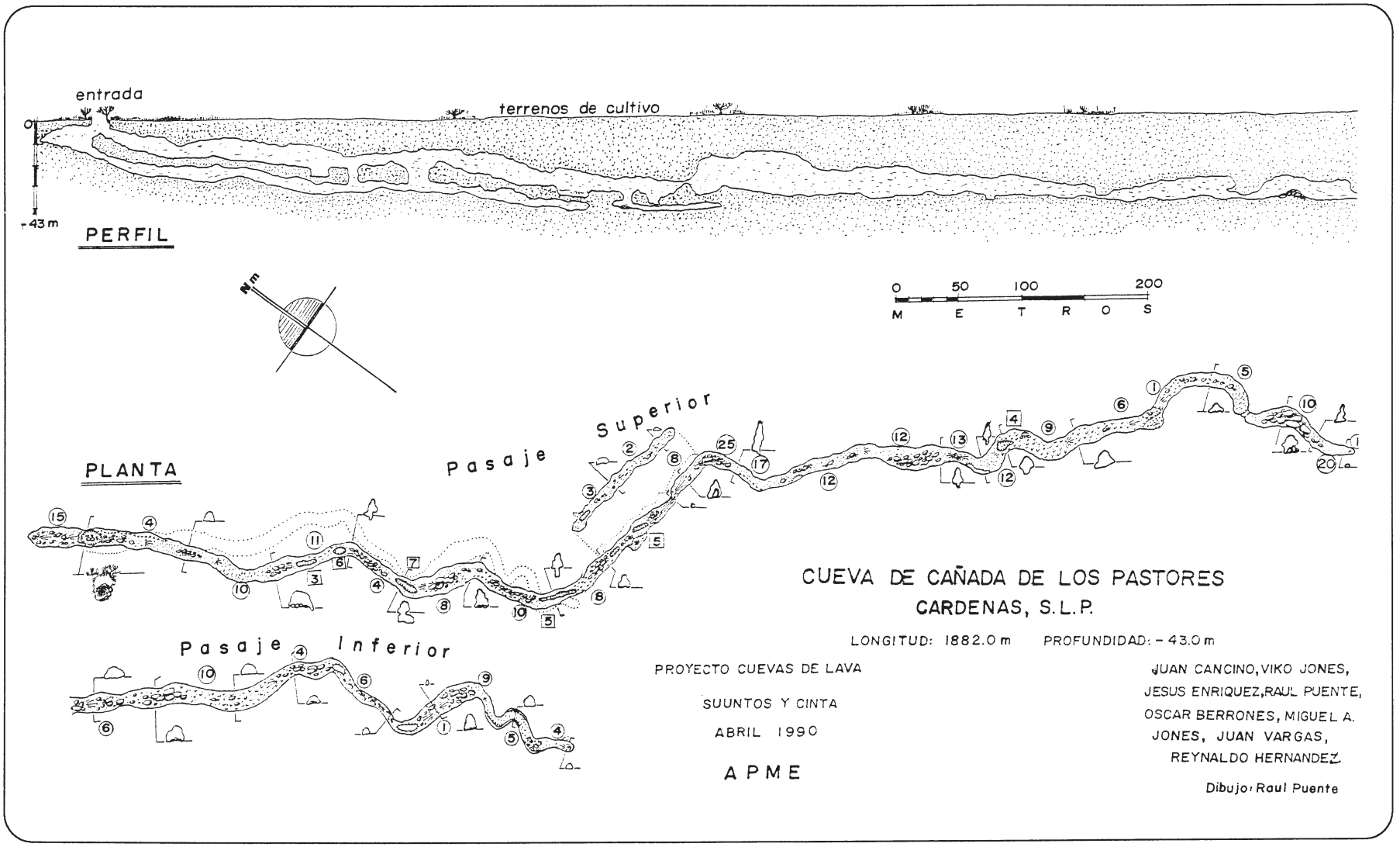
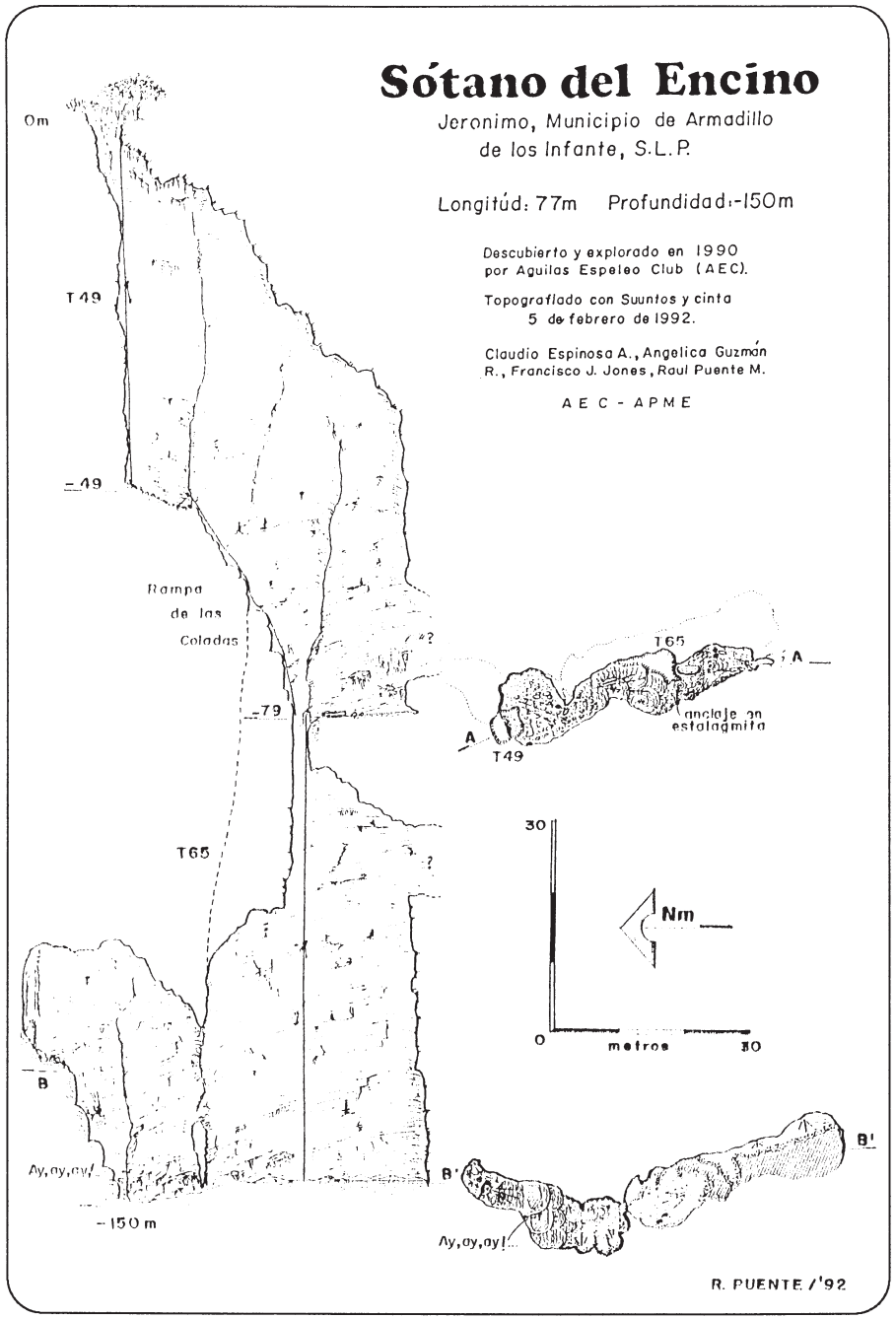
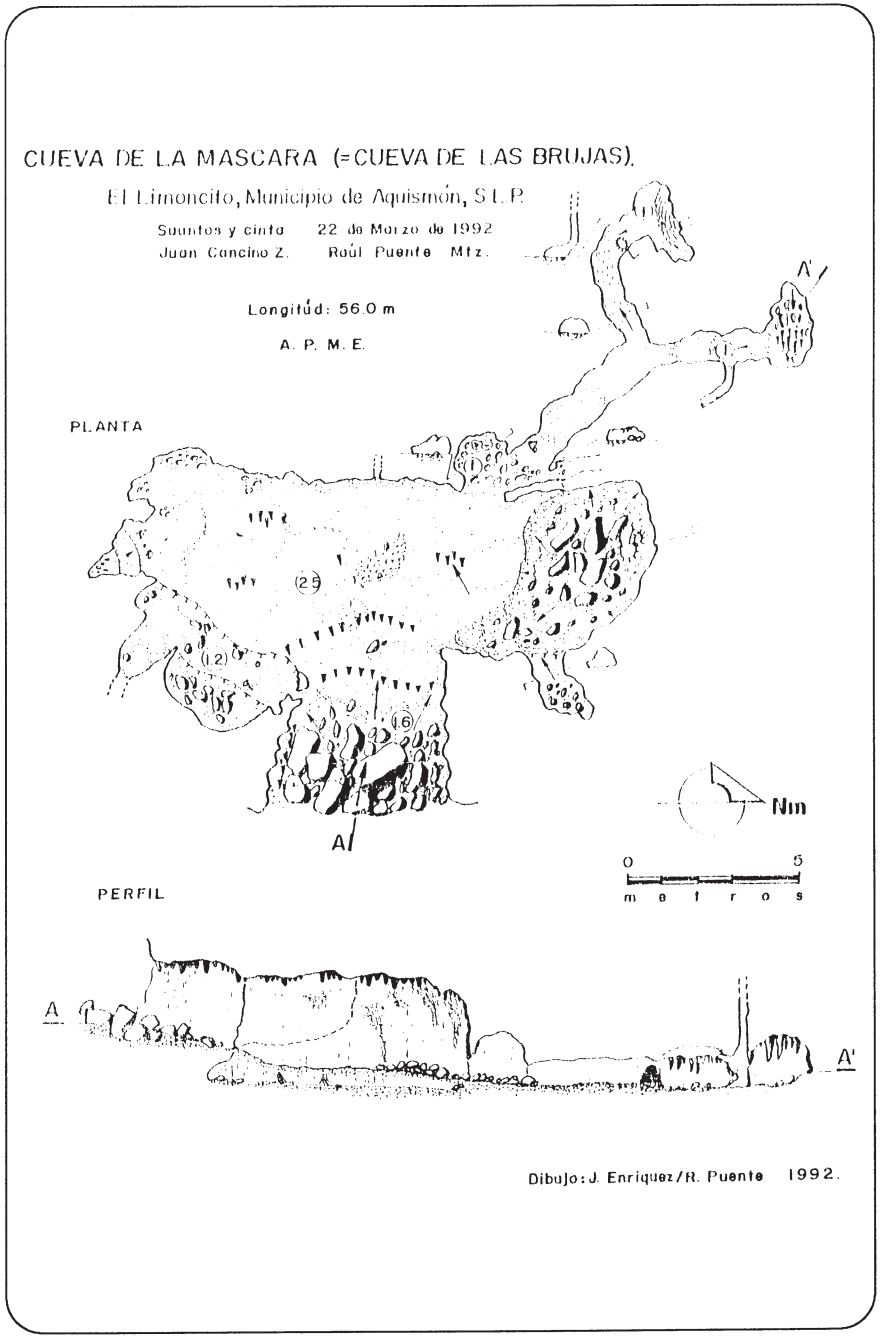
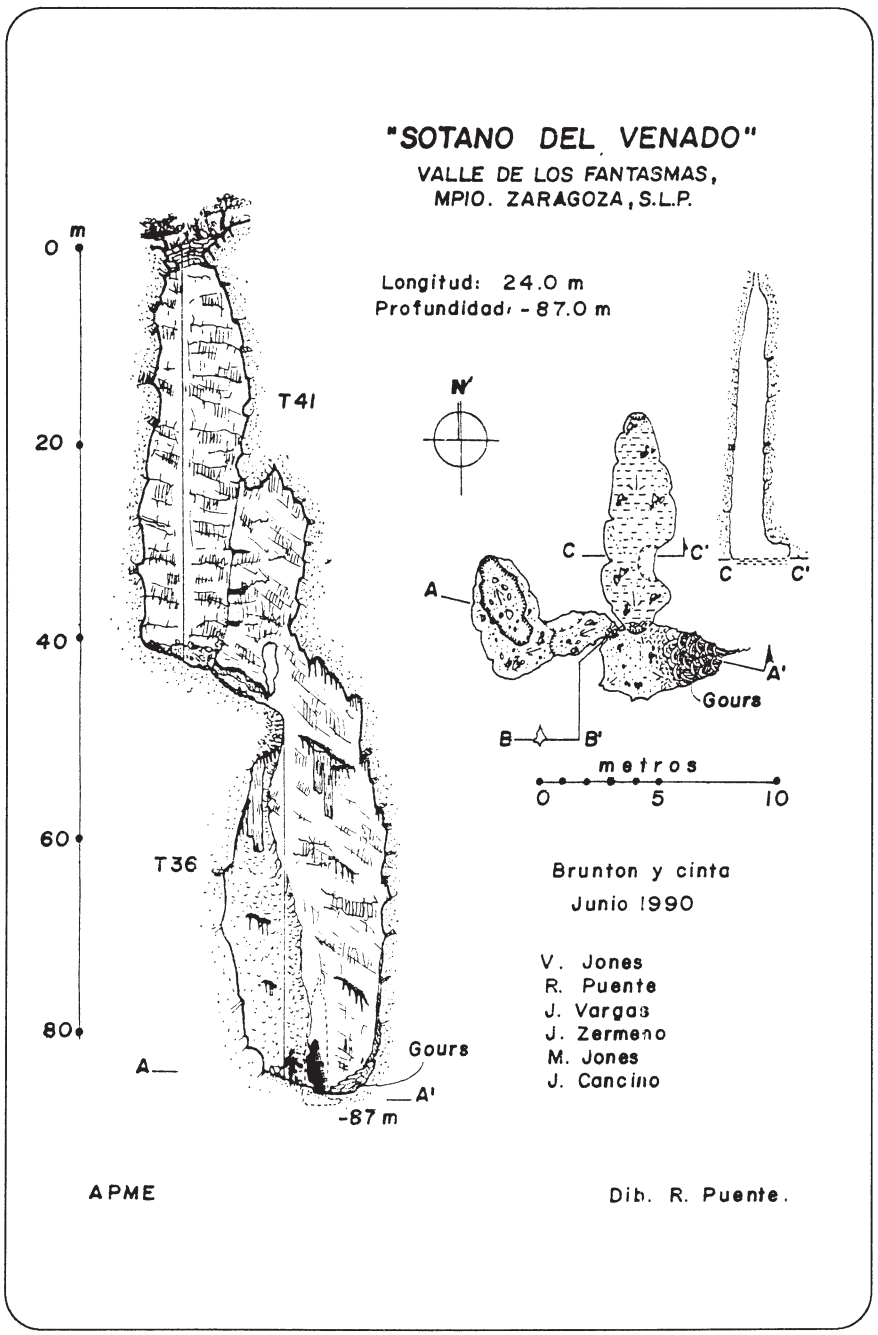
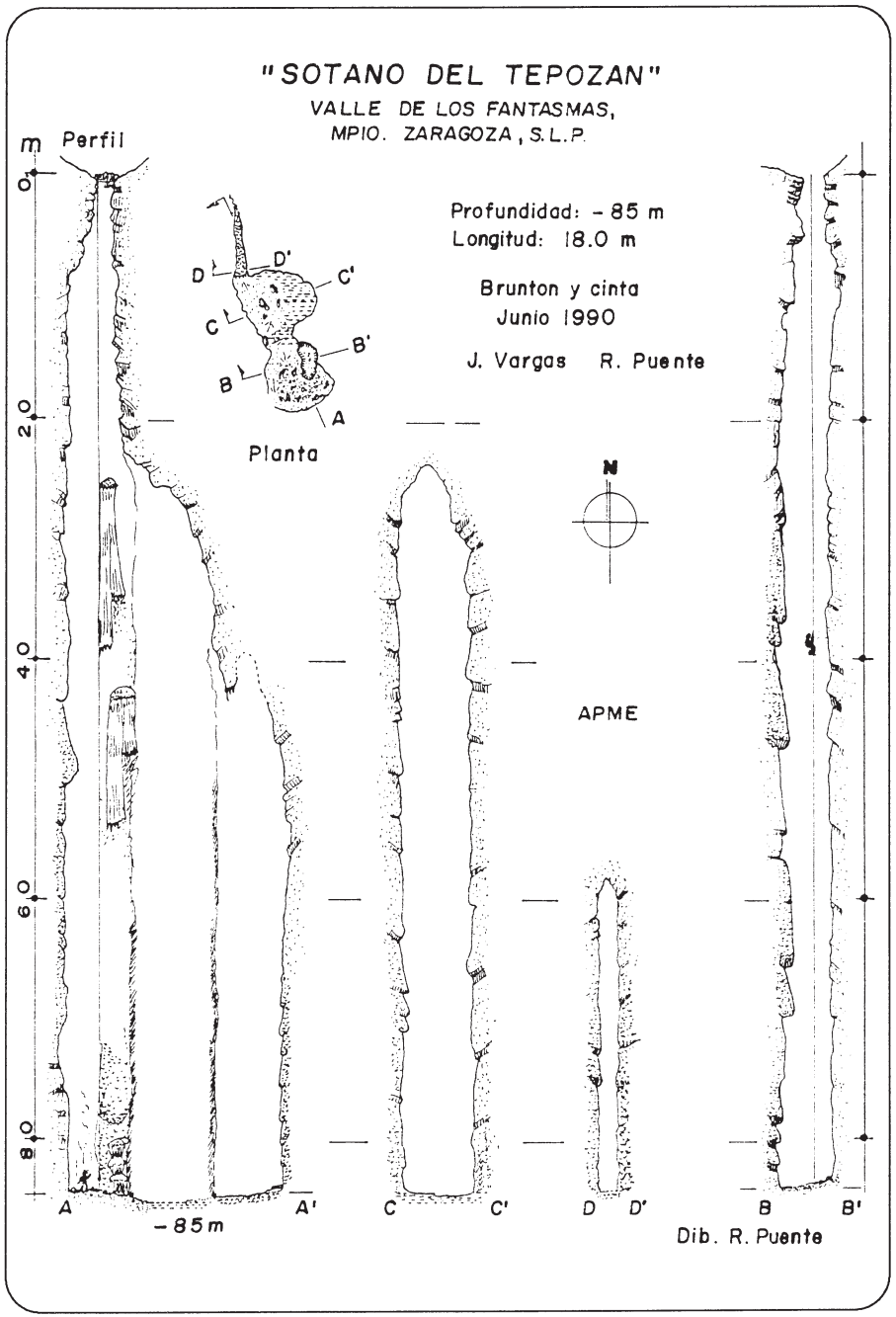
M E T R O S
"cuicillos"
continúa hacia Cueva La Ventana
PLANTA
continúa
CUEVA DE LOS CUICILLOS
CRUCERO RAYON - CARDENAS RAYON, S.L.P.
LONGITUD 976.0 m
PROFUNDIDAD -14.0 m
SUUNTO Y CINTA
JUAN CANCINO Z.
JESUS ENRIQUEZ R.
RAUL PUENTE M.
PROYECTO CUEVAS DE LAVA
A.P.M.E.
17 OCTUBRE 1990
Dibujo: RAUL PUENTE


entrada
terrenos de cultivo
0
-43 m
PERFIL
N
0 50 100 200
M E T R O S
PLANTA
Pasaje Superior
Pasaje Inferior
CUEVA DE CAÑADA DE LOS PASTORES
CARDENAS, S.L.P.
LONGITUD: 1882.0 m PROFUNDIDAD: - 43.0 m
PROYECTO CUEVAS DE LAVA
SUUNTOS Y CINTA
ABRIL 1990
APME
JUAN CANCINO, VIKO JONES, JESUS ENRIQUEZ, RAUL PUENTE, OSCAR BERRONES, MIGUEL A. JONES, JUAN VARGAS, REYNALDO HERNANDEZ
Dibujo: Raul Puente


Sótano del Encino
Jeronimo, Municipio de Armadillo
de los Infante, S.L.P.
Longitúd: 77m Profundidad:-150m
Descubierto y explorado en 1990
por Aguilas Espeleo Club (AEC).
Topografiado con Suuntos y cinta
5 de febrero de 1992.
Claudio Espinosa A., Angelica Guzmán
R., Francisco J. Jones, Raul Puente M.
A E C - A P M E
0m
T49
-49
Rampa
de las
Coladas
-79
T65
T65
anclaje en
estalagmita
A
A
T49
30
Nm
0
metros
30
B
B'
B'
Ay,ay,ay!
Ay,ay,ay!
-150 m
R. PUENTE /'92


CUEVA DE LA MASCARA (=CUEVA DE LAS BRUJAS).
El Limoncito, Municipio de Aquismón, S.L.P.
Suuntos y cinta 22 de Marzo de 1992
Juan Cancino Z. Raúl Puente Mtz.
Longitúd: 56.0 m
A. P. M. E.
PLANTA
A'
29
12
6
A
Nm
0
5
m e t r o s
PERFIL
A
A'
Dibujo: J. Enriquez/R. Puente 1992.


"SOTANO DEL VENADO"
VALLE DE LOS FANTASMAS,
MPIO. ZARAGOZA, S.L.P.
Longitud: 24.0 m
Profundidad: -87.0 m
m
0
20
40
60
80
T41
T36
N
A
A'
B
B'
C
C'
Gours
-87 m
metros
0
5
10
Brunton y cinta
Junio 1990
V. Jones
R. Puente
J. Vargas
J. Zermeno
M. Jones
J. Cancino
APME
Dib. R. Puente.


"SOTANO DEL TEPOZAN"
VALLE DE LOS FANTASMAS,
MPIO. ZARAGOZA, S.L.P.
m
Perfil
0
2
4
6
8
Profundidad: -85 m
Longitud: 18.0 m
Brunton y cinta
Junio 1990
J. Vargas R. Puente
A
A'
B
B'
C
C'
D
D'
Planta
N
APME
-85m
Dib. R. Puente

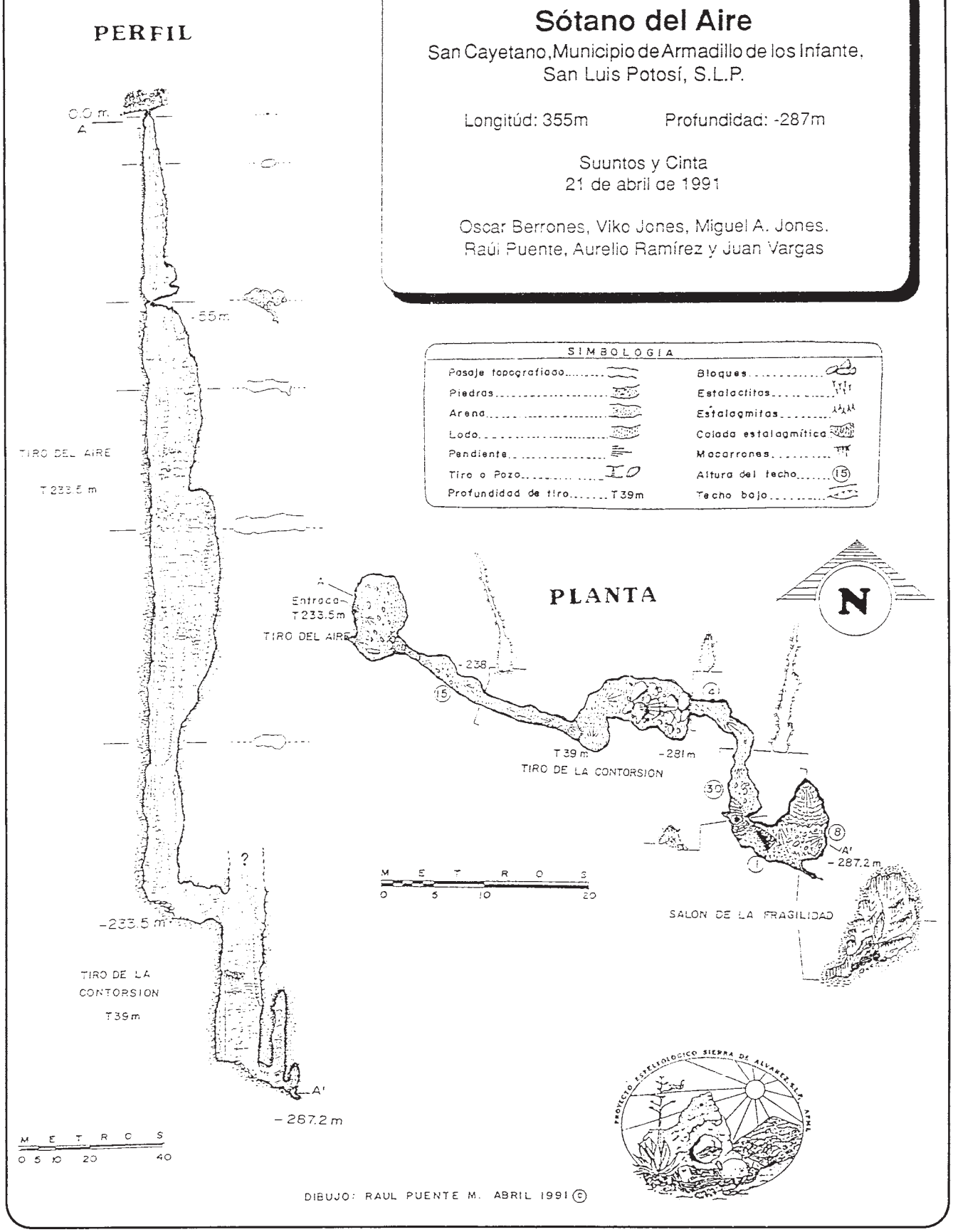
Sótano del Aire

San Cayetano, Municipio de Armadillo de los Infante,
San Luis Potosí, S.L.P.

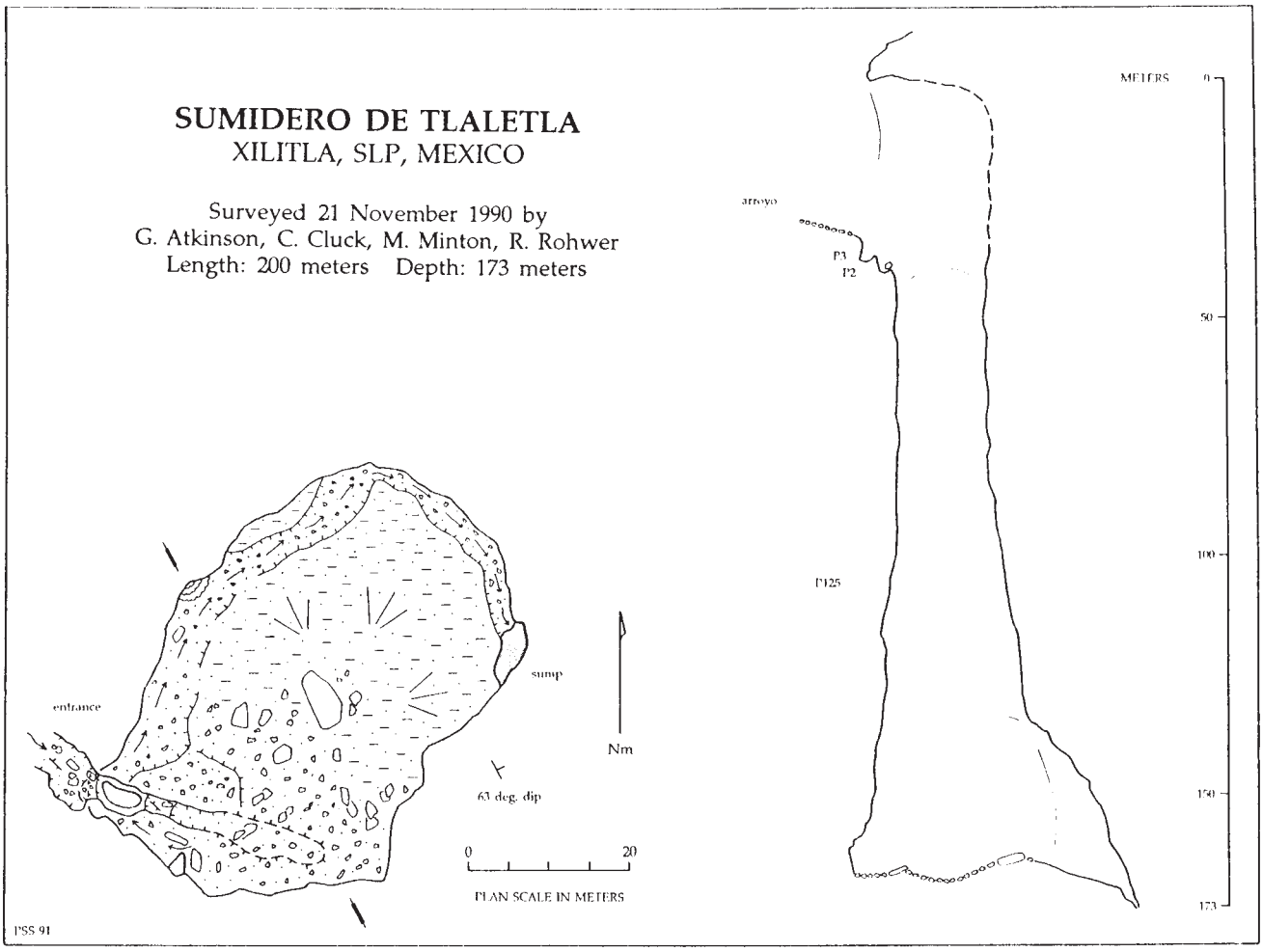
Longitúd: 355m Profundidad: -287m

Suuntos y Cinta
21 de abril de 1991

Oscar Berrones, Viko Jones, Miguel A. Jones,
Raúl Puente, Aurelio Ramírez y Juan Vargas



DIBUJO: RAUL PUENTE M. ABRIL 1991 ©



Pablo Alderete, -136 meters, **Sótano del Encino**, -150 meters, **Sótano del Tepozán**, -85 meters, **Sótano del Venado**, -87 meters, **Cueva de la Carbonera**, with thirteen pitches to a total depth of 183 meters, and **Sótano del Coyote**, with eight pitches to a depth of 60 meters.

Another important cave is **Cueva del Tizar** (formerly **Cueva de Los Murmullos**), first explored by Águilas Espeleo Club members, who were joined by APME for the survey. The 210-meter entrance drop is followed by nine more pitches up to 45 meters deep. It ends at a sump estimated to be 500 meters below the entrance. So far, the survey has reached -360 meters.

At Rayón-Cárdenas, east of the capital, the group has surveyed several lava tubes, the largest being **Cueva de Cañada de los Pastores**, 1882 meters long, **Cueva de los Cuicillos**, 976 meters, **Cueva del Salvial**, 795 meters, **Cueva de la Ventana**, 268 meters, and **Cueva del Novillo**, 136 meters.

At El Limoncita at the base of the mountains in the Golondrinas area, the APME group has surveyed **Cueva de La Máscara**, 56 meters long, **Cuevacita de las Coladas**, 20 meters, and **Nacimiento de Can-Ja**, where 485 meters of swimming passage has been surveyed. Can-Ja has been explored to a junction estimated to be 1600 meters from the entrance. On the last visit to the cave, in March 1992, by Juan Cancino and Raúl Puente, local people threw huge rocks into the cave right after the cavers entered. After surveying a short infeeder near the entrance, where they noticed signs of witchcraft and smelled copal, the pair made the fastest exit in history. *Source:* Raúl Puente.

A check-list of caves and a discussion of the geology of the San Francisco area appeared in a recent newsletter of the Sociedad Mexicana de Exploraciones Subterráneas. Several maps are included, some of them reprinted from other sources. *Source: Tepeyollotli* no.4, September 1989.

Cathy Chauvin, Jim Elliot, Joe Ivy, Libby Overholt, and Linda Palit continued south after helping resurvey Sótano delVenadito (see under Tamaulipas) in December 1991. Their objective was **Cueva de la Puente** near San Francisco. Jim and Joe began a long bolt climb at the back of the cave in an effort to reach an upper-level passage that may bypass the terminal sump. Time ran out before the climb was completed, but they plan to return soon. *Source:* Joe Ivy.

Austin cavers checked the area east of Highway 120 just south of Xilitla during Mexpeleo '89. Digging in a strongly drafting side passage in **Cueva de la Selva**

netted a short extension that had obviously been visited previously, since many Mexican names were found scratched into the walls of the final chamber. The air disappeared into a small slot. Then locals showed them a couple of short caves near the town of Plan de Juárez. Continuing through town on a road not shown on the topo map, they climbed to higher ground and rounded a curve to discover an incised arroyo disappearing down a deep pit. **Sumidero de Tlaletla** is a single, mostly free drop of 130 meters into a large room with a small sump in one corner. The entrance is a vertical slot only two meters wide, but over 30 meters tall. A few other small caves were found on a subsequent trip in November 1990. Also in November, following up on an old lead of Jerry Atkinson's, they unwittingly rediscovered 110-meter-deep **Sótano de la Porra** (or **Gorra**) outside Tlamaya. A smaller pit at the base of the hill was named **Sótano del Médico**, due to the large amount of medical waste, including used syringes, that had been dumped into it. *Sources:* Nancy Weaver, *Texas Caver*, February 1990, and Mark Minton.

Cavers from the southeastern United States have made several trips to the area southeast of Xilitla first entered by Texans in 1989 (see above) and British cavers in 1985-86. Over Christmas, 1990, Gerald Moni and Thanny Mann set up camp at Puerto de Amayo and found eleven caves and pits, including **Sótano de Cilantro**, a 57-meter drop, **Sótano de Lamoras**, later shown to be 170 meters deep with a 90-meter entrance drop, **Sótano de Quireno**, an undescended 67-meter pit, and **Sótano de Terrezu Herrara**, a 55-meter free drop with 350 meters of passage at the bottom. The latter may be the same as the **Cueva de El Limón** explored by the British. In March 1991, Gerald returned with Jack Thomison and found twenty-seven more caves, the deepest of which was **Sótano de Lutevio** (see article in this issue). **Sótano de Alicia** was a multidrop cave 115 meters deep. **Sótano de Peña Blanca** was a 27-meter pit with a large diameter and two passages at the bottom, each 250 meters long. In 1985, a boy from Xilitla died when he fell into this pit.

Seventeen cavers from the United States and Mexico explored Lutevio, Lamoras, and an additional ten caves in November 1991. **Sótano de las Ropas Perdidas** was a multi-drop cave that had obviously been visited previously, as there were footprints and carbide dumps throughout the cave. The most recent trip, in April 1992, consisted of only four people, because the other five were turned back at the border, unable to meet the new requirement that the car-owner have a Visa or Mastercard. Eighteen new caves were found, including **Sótano Rubio**, an 82-meter pit, and **Sótano Chabello Montoya**, a multi-drop cave with good air flow and a stream. Many leads remain and will be checked on a return trip planned for November 1992. *Source:* Alan Cressler. [I have the impression that these caves are not being mapped. What a waste of time!—ed.]

In addition to caves mentioned in Mexico News in *AMCS Activities Newsletter* 18, Canadian cavers working in the Xilitla area during Mexpeleo '89 visited a very large doline 30 meters deep near La Joya, but found only a short cave, **CAN 1**, at the bottom. West of Tlamaya, a local butcher showed them **Sótano de Carnesaro**, 29 meters deep. They also rediscovered **Sótano del Rincón**, north of town. A tourist visit to **Sótano de Tlamaya** was marred by garbage, especially diapers, that had been dropped into the entrance pit. *Source:* Steve Grundy, *Canadian Caver*, spring 1990.

Susie Lasko, Mack Pitchford, and Peter Sprouse surveyed **Sótano de Microondas**, near the southern El Abra pass outside Ciudad Valles. The 43-meter drop had a too-tight meander at the bottom, with a flow of very warm air. They were also shown **Cueva de Poncho**, near the large **Nacimiento del Río Coy**. Several leads were left in this interesting cave, which could provide access to the Coy aquifer. *Source:* Peter Sprouse, *Texas Caver*, February 1991.

TAMAULIPAS

A March 1992 expedition to **Sistema Purificación** by cavers of the Proyecto Espeleológico Purificación resulted in 2294 meters of new survey, making the system 78,626 meters long. Don Broussard, Michael Crawford, John Fogarty, Sue Fogarty, Jack Kehoe, Susie Lasko, and Peter Sprouse spent six days at Camp I, not far inside the lower entrance, **Infiernillo**. Much of the mapping took place in the Arrakis section, one kilometer southeast of the entrance. The Rattlesnake Trail was pushed about 500 meters to the south, but ended. Some other side-passages in Arrakis were mapped, including one that led to a new pit. A lot of activity took place in the Confusion Tubes, where plenty of leads remain even after fifteen years of steady mapping. Many new tubes were mapped in the eastern portion of the maze, adding 643 meters there. Several side-leads were also mapped in the western portion, around the Misty Borehole. A bit farther south, a new extension, called the Birthday Room, was made off the Hellenic Borehole.

PEP expeditions in Novembers of 1990 and 1991 concentrated on the Corona area, just southeast of Sistema Purificación. The first expedition saw new exploration and mapping in **Sótano de las Calenturas**, with two new entrances, Arañas and Bolsa, found in the upper part. Length was added near Roman Pit, Stoned Salamander Pit, and Thanksgiving Thruway, for a total of around 700 meters of new survey.

On the same expedition, a large cliff entrance called **Cueva de la Garganta** was reached via a 50-meter rappel down a cliff. It was spectacular, being perched 200 meters above the canyon floor, but only went 100 meters as a breakdown chamber. Previously explored **Cueva del Río Corona**, the presumed resurgence cave for Calenturas, was mapped for 906 meters. Other minor caves mapped on the expedition were **Cueva Pereza**, 68 meters long, **Cueva del Cuero**, 56 meters, **Cueva de la Tamabra**, 20 meters, and **Cueva del Comando**, 16 meters.

The return trip in 1991 saw more work in Calenturas. A new passage off the northern part of the Turas Tubes, called the Brown Tangerine, yielded 125 meters, and cleanup survey was done in the Hong Kong maze. Jim Bowden and other divers continued their exploration of the upstream sumps, doing about 500 meters of new and resurvey. **Sótano de las Calenturas** is currently 7511 meters long. Work also resumed at **Cueva del Río Corona**, where the remaining known passage was mapped, making it 1150 meters long. A cave in the cliff just above the Corona, called **Pie en Boca**, was also mapped, leading to a sump just opposite a sump in Cueva del Río Corona.

A rappel of a 150-meter waterfall gained access to **Cueva Paraíso Difícil**, described further below. Another 150-meter cliff rappel was done to reach **Cueva de El Violín**, several kilometers northwest of Yerbabuena on the west side of the Corona canyon. A waterfall had been seen pouring out of this entrance during a rainy-season aerial reconnaissance. About 150 meters of mazey walking passage was mapped to six different sumps.

A 50-meter rappel down the cliff southwest of the Corona resurgence led to **West Cliff Cave**, which turned out to be a mere shelter. To the south, near Los San

Pedro, a fissure-maze cave called **Sótano de Cerro de la Cruz** was mapped for about 200 meters to an apparent end.

A number of more minor trips to the Purificación area in recent years have added new caves to the roster and extended others. In May 1990, a trip to the **Cueva del Brinco** portion of **Sistema Purificación** resulted in about 200 meters of new survey. Most of this was in an upstream extension to the Dragon River, where three lead-climbs up waterfalls were done. Then, in September 1990, a recon was done at the southern end of the project area, near Pino Solo, by Susie Lasko, Raúl Puente, Peter Sprouse, and Corey Zeigler. Two new caves were mapped, **Cueva de la Caseta Forestal**, 55 meters long, and **Cueva de los Treboles**, a 15-meter-long rift that may have been previously explored. This area was revisited in January 1992 by Michael Crawford, Peter, and Susie, resulting in the mapping of 60-meter-long **Cueva Rabona**, a formation cave above La Reforma. Also mapped was **Cueva de la Nieve**, a 50-meter-long tectonic fissure underneath Highway 101.

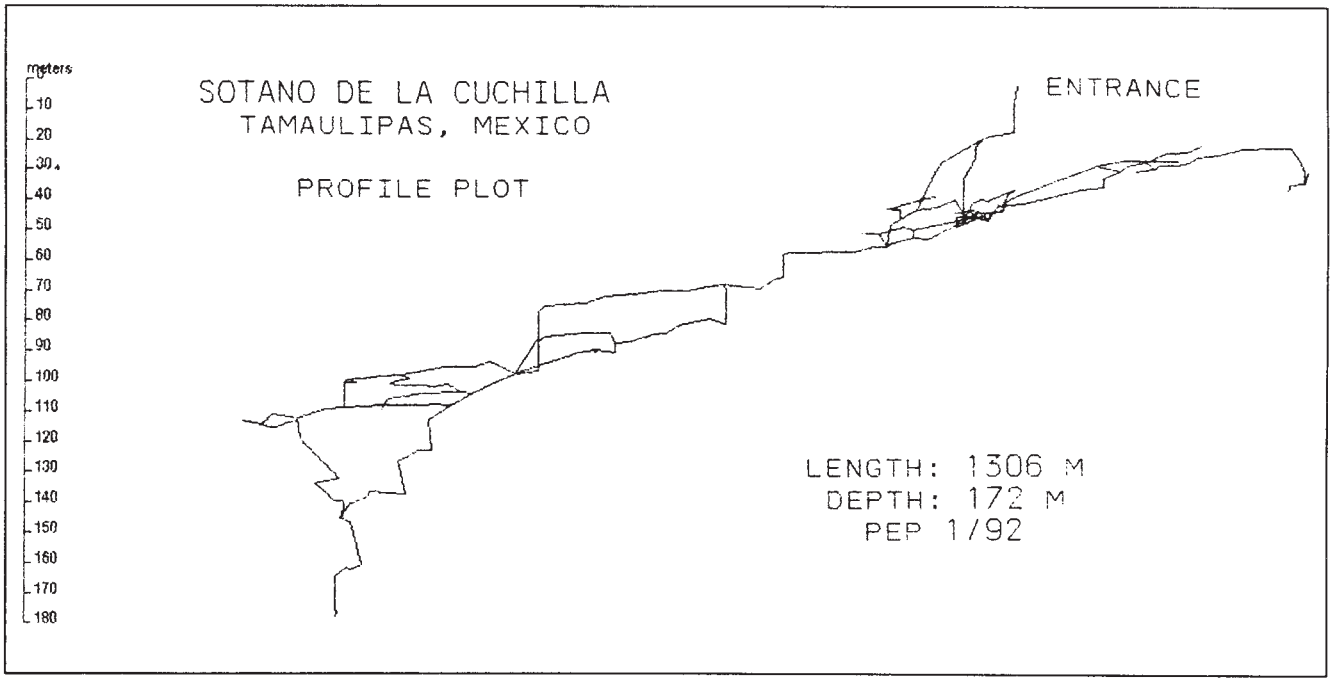
A trip was made in May 1991 to the area near **Cueva de la Llorona**, in which a push was made in the Frankenstein Room, resulting in only 50 meters of new survey. A number of small caves were mapped near Llorona and tied in to the surface survey: **Sótano de la Silla**, 9 meters deep, **Sótano Sin Ramales**, 9 meters deep, and **Cueva Diente de Tiburón**, 10 meters deep. Near El Chihue field more caves were found: **Cueva Buzz**, 12 meters long, **Cueva Pico y Pala**, 10 meters, and **Cueva Saluki**, 10 meters.

In December 1991, exploration was conducted around Conrado Castillo, near the Brinco entrance to Sistema Purificación. In **Cueva del Borrego**, another 168 meters of complex maze was added, making that cave 1354 meters long. Upon leaving that cave, Allan Cobb slipped and dislocated a knee. In **Sótano de la Cuchilla**, some upper and lower loops were discovered, adding 182 meters for a total of 1306 meters. At attempt to push the Dragon River waterfalls in **Sistema Purificación** was sumped out by high water levels. Four new pits were found in the vicinity: **Pozo Inteligente**, 48 meters deep, **Pozo Lucha Culebra**, 9 meters deep, **Sótano Deslocalizado**, 40 meters deep, and **Pozo Pinto**, 32 meters deep. A bit lower down, near Galindo, two small caves, **Cueva Cassiopeia**, 35 meters long, and **Cueva Magnolia**, 32 meters long, were mapped. *Source:* Peter Sprouse.

On March 28, 1989, Sheck Exley set a new world depth record for any surface-to-surface Scuba dive with a cave dive to about -265 meters in **Nacimiento del Río Mante** (see also *AMCS Activities Newsletter* 17). A ten-person team of divers from the United States and Mexico supported the dive, which took 13.5 hours and required twelve different gas mixtures in thirty-one tanks. Various specially constructed pieces of gear were used to deal with the extreme pressures at that depth. Instead of leveling out, as expected, the underwater pit continued almost straight down. *Source:* Sheck Exley, *NSS News*, June 1989, *Underwater Speleology*, May-June 1989.

A resurvey of **Sótano de Venadito** was begun under the direction of Don Broussard during Mexpeleo '89, and is continuing. This major arroyo cave on the west side of the Sierra de El Abra was first surveyed in the '60s and '70s, but the notes were lost and a map was never produced. The 55-meter entrance shaft is followed by several more drops to base level, which requires substantial swimming to traverse. On the most recent trip, in December 1991, a previously unknown window was noticed on the far wall of the entrance pit, near the bottom. It will require aid to enter and will be a prime goal of the next trip. To date about one kilometer has been surveyed out of an estimated two kilometers of total known cave. *Source:* Don Broussard, *Texas Caver*, February 1990, and Joe Ivy.

A potentially major new cave, **Cueva Paraíso Difícil**, was discovered in the Purificación area in December 1990 by Terry Gregston, accompanied by Paul Fambro and Robert Schulze. The main entrance was dry, approximately 10 meters wide by 30 meters high, and located midway down a 220-meter-high cliff. A second, wet entrance was spotted 30 meters lower. Fifty meters to the side of the entrance a waterfall dropped the



full height of the cliff into an emerald pool.

In November 1991, after a 150-meter rappel down the waterfall and a technical climb up into the entrance, the first team entered Paraíso. The main borehole passage ran almost level for 300 meters and then dropped 30 meters into a large room. This room, 30 by 30 meters and 50 meters high, contained a waterfall and massive formations. Leads were seen both upstream and downstream.

In April 1992, an eight-person crew set a camp just inside the main entrance to reduce travel time. The lower resurgence entrance was entered but appeared to sump after about 200 meters of mostly swimming passage. A lead upstream from the big room proved to be well decorated but not very productive; downstream leads were sumped due to high water, but probably connect to the resurgence entrance. The most promising lead is the continuation of the main borehole at the top of the waterfall on the opposite side of the big room, but it will require a serious technical climb. *Source:* Terry Gregston.

Recent explorations in the Purificación karst are described in a new Proyecto Espeleológico Purificación publication, *The Death Coral Caver*. In addition to extensions of the area's major caves **Brinco-Infiernillo (Sistema Purificación)**, **Tecolote**, **Calenturas**, and **Llorona**, many smaller caves are described. "Death coral," a painful-to-traverse speleothem common in the area, is discussed in detail. *Source: Death Coral Caver* no. 1, October 1991.

Jerry Atkinson, Chuck Cluck, and Rich Rohwer surveyed **Cueva de Tiguere** in the Olmo canyon at the base of the Purificación karst in November, 1990. This 300-meter-long borehole was first found by Charles Fromén in the mid-1970s. *Source:* Peter Sprouse.

Six Texas cavers checked the east crest of the Sierra de Guatemala north of the **Nacimiento del Río Sabinas** in November 1991. After driving to Julilo, they cleared the roads to within a two-hour walk of Carabanchel. In addition to some promising pit leads, they discovered strange stone walls of undetermined age built through the karst, with no apparent purpose. They returned via Rancho de Cielo to Gómez Farías, but the road was very bad going down off the mountain. A return is planned. *Source:* Bill Russell.

After visiting **Cueva de El Abra**, British caver Dave Jarman got his foot wedged in the loose talus leading down from the cave, causing him to fall. He sustained a compound fracture of the right ankle as well as a second fracture below the right knee. Fortunately, he was with a large party of British and Texas cavers who were able to splint the leg and fabricate a makeshift stretcher to transport him the rest of the way down to the road. He was treated successfully in a hospital in Valles. *Source:* Don Denton, *Texas Caver*, February 1992.

VERACRUZ

An international team of cavers led by Ramón Espinasa of SMES has pushed **Sótano de El Berro** (see Mexico News in *AMCS Activities Newsletter* 18) at the base of Pico de Orizaba to a sump at a depth of 818 meters. Some leads remain. On one trip out of the cave, a large rock serving to anchor a rebelay broke off while someone was crossing it. The caver ended up suspended in the pit with a forty-kilogram rock attached to his cow's tail. Fortunately, he got off with only a scare. *Source: Sous Terre*, Spring 1991.

The British Black Holes Expedition that is the subject of an article elsewhere in this issue visited some caves in Veracruz.

YUCATÁN

NASA satellite images have revealed a semicircle of water-filled sinkholes near Chicxulub that are believed to be evidence of an enormous impact crater over two hundred kilometers in diameter. The so-called Cenote Ring has been found from core samples to date from the Late Cretaceous, about 65 million years ago. Several other pieces of evidence have led scientists to conclude that this may be a remnant of the impact of a large extraterrestrial body that is proposed as an explanation for the extinction of the dinosaurs and the beginning of the Tertiary period. *Source: Nature*, May 9, 1991.

TAKE NOTHING BUT PICTURES
LEAVE NOTHING BUT FOOTPRINTS
KILL NOTHING BUT TIME

LONG CAVES OF MEXICO

Peter Sprouse
June 1992
Length in meters

1	Sistema Purificación	Tamaulipas	78626
2	Sistema Huautla	Oaxaca	52653
3	Cueva del Tecolote	Tamaulipas	28119
4	Sistema Cheve	Oaxaca	22500
5	Sistema Cuetzalan	Puebla	22432
6	Coyalatl	Puebla	19000
7	Sistema Naranjal (Najaron-Maya Blue)	Quintana Roo	15850
8	Kihaje Xontjoa	Oaxaca	13500
9	Nohoch Nah Chich	Quintana Roo	13381
10	Atlixicalla	Puebla	11700
11	Grutas de Rancho Nuevo (San Cristóbal)	Chiapas	10218
12	Nelfastla de Nieva	Puebla	8500
13	Cueva de Arroyo Grande	Chiapas	8334
14	Sistema de Angel (Ehocoklh)	Puebla	8000
15	Sumidero Santa Elena	Puebla	7884
16	Cueva Yohualapa	Puebla	7820
17	Cueva de la Peña Colorada	Oaxaca	7793
18	Cueva de Comalapa	Veracruz	7750
19	Atepolihuit de San Miguel	Puebla	7700
20	Sótano de Las Calenturas	Tamaulipas	7511
21	Sótano del Arroyo	San Luis Potosí	7200
22	Actún Kaua	Yucatán	6700
23	Cueva del Mano	Oaxaca	6630
24	Xongo Dwi'ñi	Oaxaca	6500
25	Sumidero de Jonotla	Puebla	6381
26	Gruta del Río Chontalcoatlán	Guerrero	5827
27	Sistema H31-H32-H35	Puebla	5745
28	Gruta del Río San Jerónimo	Guerrero	5600
29	Los Bordos	Chiapas	5211
30	Cueva de Agua Blanca	Tabasco	5200
31	Grutas de Juxtlahuaca	Guerrero	5098
32	Cueva Quebrada	Quintana Roo	5000
33	Veshtucoc	Chiapas	4930
34	Sistema Ocotempa	Puebla	4720
35	Sistema Guayateno	Puebla	4720
36	Cueva del Nac. del Río San Antonio	Oaxaca	4570
37	Sac Actún	Quintana Roo	4542
38	Sistema Atlalaquia	Veracruz	4530
39	Sótano de la Tinaja	San Luis Potosí	4502
40	Sótano de Japones	San Luis Potosí	4500
41	Cueva Escalera	Oaxaca	4500
42	Sótano de Agua de Carrizo	Oaxaca	4477
43	Sistema San Andres	Puebla	4471
44	Sumidero de Pecho Blanco No. 2	Chiapas	4435
45	Cenote Zapote	Quintana Roo	4298
46	Sótano del Río Iglesia	Oaxaca	4206
47	Sistema Zoquiapan	Puebla	4107
48	Sima del Borrego	Guerrero	4087
49	Aztotempa	Puebla	4000
50	Cueva Burrodromo	Quintana Roo	3962

Beyond the third drop,
Pozo de Montemayor.
Peter Sprouse.

Peter Sprouse
June 1992
Depth in meters

DEEP CAVES OF MEXICO

1	Sistema Cheve	Oaxaca	1386
2	Sistema Huautla	Oaxaca	1353
3	Akemati	Puebla	1200
4	Kijahe Xontjoa	Oaxaca	1160
5	Sistema Ocotempa	Puebla	1070
6	Akemabis	Puebla	1015
7	Sonconga	Oaxaca	943
8	Guizani Ndia Guinjao	Oaxaca	940
9	Sistema Purificación	Tamaulipas	904
10	Nita Cho	Oaxaca	894
11	Sótano de Agua de Carrizo	Oaxaca	843
12	Sótano de El Berro	Veracruz	838
13	Sótano de Trinidad	San Luis Potosí	834
14	X'oy Tixa	Oaxaca	813
15	Nelfastla de Nieva	Puebla	778
16	Nia Quien Nita	Oaxaca	767
17	Nita Ka	Oaxaca	760
18	Sistema H31-H32-H35	Puebla	753
19	Sonyance	Oaxaca	745
20	Nita Xonga	Oaxaca	740
21	Yu Nita	Oaxaca	704
22	Aztotempa	Puebla	700
23	Sótano de los Planos	Puebla	694
24	Resumidero el Borbollón	San Luis Potosí	678
25	Sótano de Tilaco	Querétaro	649
26	Nita Nashí	Oaxaca	641
27	Sistema Atlalaquía	Veracruz	623
28	Cueva de Diamante	Tamaulipas	621
29	R'ja Man Kijao	Oaxaca	613
30	Nita He	Oaxaca	594
31	CH54 (Meandre-Qui-Traverse)	Puebla	588
32	Sistema Cuetzalan	Puebla	587
33	Sótano de las Coyotas	Guanajuato	581
34	Sótano Arriba Suyo	San Luis Potosí	563
35	Sistema de Angel (Ehecoklh)	Puebla	533
36	Sótano del Río Iglesia	Oaxaca	531
37	Sótano de Nogal	Querétaro	529
38	Grutas de Rancho Nuevo	Chiapas	520
39	Sótano de Ahuihuitzcapa	Veracruz	515
40	Sótano de las Golondrinas	San Luis Potosí	512
41	Hoya de las Conchas	Querétaro	508
42	Sótano del Buque	Querétaro	506
43	Pozo de Montemayor	Nuevo León	501
44	Cueva del Tizar	San Luis Potosí	500
45	Nita Chaki	Oaxaca	493
46	Hoya de las Guaguas	San Luis Potosí	478
47	Cueva de San Agustín	Oaxaca	461
48	Cueva de Agua de Carlota	Oaxaca	460
49	Sótano de El Barro (El Sótano)	Querétaro	455
50	Hoya de San Miguel	Guerrero	455

DEEP PITS OF MEXICO

Peter Sprouse
June 1992
Depth in meters

1	Sótano de El Barro (El Sótano)	entrance drop	Querétaro	410
2	Sótano de las Golondrinas	entrance drop	San Luis Potosí	376
3	Sótano de Tomasa Kiahua	entrance drop	Veracruz	330
4	Sótano de Alhuastle	P'tit Quebec	Puebla	329
5	Nita Xonga	Psycho Killer	Oaxaca	310
6	Sotanito de Ahuacatlán	second drop	Querétaro	288
7	Sótano del Arroyo Grande	entrance drop	Oaxaca	283
8	Resumidero del Pozo Blanco	entrance drop	Jalisco	233
9	Sótano del Aire	entrance drop	San Luis Potosí	233
10	Sistema Ocotempa	Pozo Verde	Puebla	221
11	Sótano de los Planos	second drop	Puebla	220
12	Sótano de Eladio Martínez	entrance drop	Veracruz	220
13	Sótano de Coatimundi	entrance drop	San Luis Potosí	219
14	Sótano de Sendero	entrance drop	San Luis Potosí	217
15	Resumidero el Borbollon	first drop	San Luis Potosí	217
16	Cueva del Tizar	entrance drop	San Luis Potosí	210
17	P17	entrance drop	Oaxaca	209
18	Nacimiento del Río Mante	Macho Pit	Tamaulipas	206
19	Hoya de las Guaguas	entrance drop	San Luis Potosí	202
20	Sistema de la Lucha	entrance drop	Chiapas	200
21	Sistema H3-H4		Puebla	200
22	Kijahe Xontjoa	sixth drop	Oaxaca	199
23	Sótano de Soyate	entrance drop	San Luis Potosí	195
24	Sótano de Alpupuluca	entrance drop	Veracruz	190
25	Cuaubtempa	Pozo con Carne	Puebla	190
26	Sótano de Puerto de los Lobos	entrance drop	San Luis Potosí	189
27	Sótano de Hermanos Peligrosos	second drop	Veracruz	186
28	Hoya de la Luz	entrance drop	San Luis Potosí	180
29	Ahuihuitzcapa	entrance drop	Veracruz	180
30	Sima del Cedro	entrance drop	Chiapas	175
31	Sótano de la Cuesta	entrance drop	San Luis Potosí	174
32	Sima Dos Puentes	entrance drop	Chiapas	172
33	Sótano de los Monos	entrance drop	San Luis Potosí	171
34	Sótano de Otates	third drop	Tamaulipas	171
35	El Socavón	entrance drop	Querétaro	171
36	Sótano de los Ladrones	entrance drop	Oaxaca	170
37	Nita Diplodicus	entrance drop	Oaxaca	170
38	Sótano de Agua de Carrizo	Flip Pit	Oaxaca	164
39	OC8	entrance drop	Puebla	160
40	OC4	entrance drop	Puebla	160
41	Kijahe Xontjoa	Void Drop	Oaxaca	155
42	Pozo de Las Chinas	China Well	Tamaulipas	154
43	Ventana Jabalí	skylight drop	San Luis Potosí	153
44	Sótano de Coatituesday	entrance drop	San Luis Potosí	147
45	Sótano del Caballo Moro	entrance drop	Tamaulipas	146
46	Sótano de Milpa	entrance drop	Veracruz	146
47	Sótano de Atlalaquia	upper entrance drop	Veracruz	145
48	Sótano de Paila	entrance drop	Querétaro	143
49	Sótano de los Guacamayos	entrance drop	Tamaulipas	140
50	Sótano del Río Iglesia	Xmas Shaft	Oaxaca	140

ARTICLES

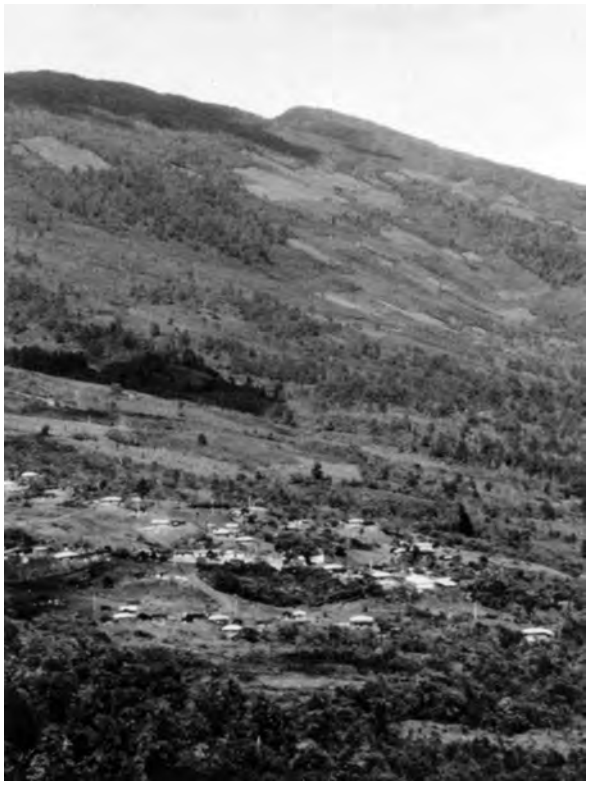
1991 AND 1992 EXCURSIONS IN ARROYO GRANDE, CHIAPAS

Miles Drake

Halfway between the state capitals Villahermosa, Tabasco, and Tuxtla Gutiérrez, Chiapas, along highway 195 is the town of Pueblo Nuevo Solistahuacán. In 1990 a group of U.S. cavers converged on this town at the beckoning of Ruben Comstock, whose family founded a Seventh Day Adventist retreat, school, and clinic. He continued his grandfather's interest in caves, but desired the company of fellow cavers. At the end of three weeks (*AMCS Activities Newsletter* 18), the group all agreed that this area would require much more work, and that it might be better to target the area of the Ejido Arroyo Grande. This small Tzotzil village on the other side of the small ridge northeast of Solistahuacán is accessible by car in dry weather. (You would do well to remember that phrase, "dry weather.") In 1990, it was discovered that our almost daily commute detracted from the joys of caving, so Ruben volunteered to arrange a secure building and a cook for the next year. In this way we could arise each day, eat, and be underground in as little as an hour and a half.

Arroyo Grande is located in the upper reaches of a strikingly symmetrical valley. The valley looks as if a giant pie-shaped wedge had been removed. The apex, where there is a large resurgence, is also the top of a narrow canyon leading off downstream away from the wedge. From the apex up into the wedge, multiple sandstone cliffs diverge up-dip toward the ridge line, until they are seven kilometers apart. From ridge line to apex is five kilometers. The floor of this valley is mostly limestone, the topographic gradient paralleling the 15-degree northeast dip except toward the top, where headward erosion has not yet breached the sandstone cap. There remains enough of a catchment along the ridge to generate many small streams that are swallowed at the contacts, creating shafts. Some of these shafts penetrate through two deeper 10-to-15 meter-thick sandstone layers to depths of over 200 meters. At least one major horizontal cave has developed along the surface of these sandstones. Cueva del Arroyo Grande was surveyed to 3,600 meters, with much left to survey.

The Village of Arroyo Grande. *Don Glasco.*



Returning in February 1991 were Don Coons from Illinois, Miles Drake, Fred Grady, Joanne Smith, and Tom Wilson, all from the D.C. area, and Jim Pisarowicz from California. Chris Welsh from D.C. also came with us. As in the first year, there were some last-minute welcome additions: Mark Crapelle from Canada and Liz Canning from Australia, traveling on their way to South America, and Peter Haberland from New Jersey and Matt Oliphant from California, both looking for a warm-up trip before Cheve. All were again hosted by Ruben and Michelle Comstock of the Seventh Day Adventist colony. Ruben had arranged for us to stay with the Juan Díaz López family in the workshop area of their home, with his wife Marta and daughters as "on call" cooks.

Of primary importance was to run a survey to connect upper to lower Cueva del Arroyo Grande and to survey as many of the remaining leads from the 1990 trip as possible. Ruben had located another large borehole across the upper entrance sink, as well as a nearby resurgence 30 meters off the floor of a large cliff-lined sink called La Poza.

We started on February 4, divided

Miles Drake at Cañon Zeta waterfall. *Jim Pisarowicz.*

into two groups to survey toward each other. To connect upper Arroyo Grande to lower Arroyo Grande was not as easy as we anticipated. Of our crew, only Ruben had actually done the through trip, and he was not on this first trip. Chris, Peter, Joanne, and I went into the upper entrance and down the main borehole passage, 20 to 30 meters wide by 7 to 10 meters high, and into Cañon Zeta to the Pasadizo de Flores Yeso (the Gypsum Passage). It is only along this serpentine canyon that you encounter anything resembling a crawl.

This upper-level passage once was an infeeder to Cañon Zeta from Sibec Beyon (Charcoal Canyon). A 10-meter handline pit drops into Sibec Beyon, where we were to begin surveying. An active stream flows toward, but never quite reaches, the lower entrance. The lower few meters of rock are punky and covered with a black polish that made for interesting traversing. Although Sibec Beyon is 1 to 2 meters wide and up to 15 meters high, our eighty-one shots averaged 6 meters, and we stopped before we reached the other group heading toward us. We democratically decided to do the through trip. I lost. It was some 1400 meters before I recognized a landmark, still more than an hour from the lower entrance. After twenty-one hours, it was again daylight, and trail hunting on our hike back up the hill was easier.

Jim, Fred, and Tom entered the lower entrance to continue last year's survey toward us. The large entrance passage becomes choked with impenetrable breakdown, but a passage to the left, the F survey, leads past a waterfall-pit lead, the Toilet, or Cascada Inodora. After 800 meters of comfortable canyon 2 to 3 meters wide by 10 meters high, a high dome complex and confusing side passages are reached. Beyond this 800 meters, the upstream passage is more challenging. After surveying the last 359 meters of that in fifty-six stations, they had turned back.

On February 5, it was up to Ruben, Don, Liz, Mark, and Matt to connect the ends in only twenty-two stations totaling 345 meters, in an eight-hour through trip.

Meanwhile, Jim, Fred, and Tom started the T survey in the maze left of the upper entrance, netting an additional 245 meters. This section trended beyond the entrance under the north wall of the doline and was quite damp.

February 6, Jim, Tom, Joanne, and Miles surveyed 217 meters of fairly sleazy passage, continuing the T survey. The other looked at Ruben's borehole, 30 meters wide and 300 meters long to where it intersects another sinkhole. Because of its proximity to Cueva de Queso Suizo (Swiss Cheese Cave), it got named Queso Grande, and a smaller segment is named Queso Chico. In surveying one of the many side passages, Matt, Chris, Don, and Peter connected to 521-meter-long Queso Suizo. A surface survey was run from upper Arroyo Grande past Queso Grande to Queso Chico. With many leads left, hopes ran high for a connection with upper Arroyo Grande. The day's total for this seven-person crew was 777 meters, not including Queso Suizo and considerable surface survey.

The next day, one last trip was taken to finish the T-survey area in upper Arroyo Grande. Mark, Fred, Tom, and Joanne netted 160 meters of tight, sloppy, and terminal leads.

Ruben was hot to push his Cueva de La Poza and recruited Don, Matt, and me for a look. The approach was not without interest. La Poza is two coalescing cliff-lined sinks, each some 150 meters by 80 meters at their tops and 100 meters deep, with a land bridge separating the bottoms. The entrance is 30 meters off the floor of the western sink. Ruben had chopped a trail traversing both sinks to the top of a 50-meter cliff overlooking the entrance. We could either lug an extra rope, rappel to the bottom, and climb back up 30 meters to the entrance, or there was a trail, sort of, which we took. The bottom half of the trail was basically your own personal rockslide. Somehow, last year Ruben and his friend Jerry Wilson had traversed a ledge over to the entrance and rigged from it to the bottom of the sink. We all hung on this year-old rope, and it held. Don climbed up with a replacement rope. Just 10 meters inside the alcove entrance, a stream plunges down a 30-meter pit to a small entrance at the bottom of the cliff in the sink. This and the bottom breakdown in the sink have yet to be checked. Our first interest was to push upstream. Clean-washed streamway 1 to 2 meters wide and 4 to 10 meters high with easily climbed waterfalls had developed primarily along a fault with only a few centimeters throw. Matt got to exercise his climbing ability, leading a 5-meter climb around and above a deep plunge pool. We all were still dry when we reached another deep plunge pool that would require not only deep wading, but also a tricky-looking waterfall climb. We turned back with 371 meters in thirty-nine stations. Night had fallen, and the golondrinas that roost in the entrance, surprised by our arrival, flew toward the only available light, ours. An interesting experience.

Also on February 7, Liz, Peter, and Chris surveyed a higher entrance above the second main entrance to Queso Grande, but they were turned back by very loose traverses. Rocks tossed beyond the traverse indicated another pit, perhaps accessible from a side lead off the main passage below.

Inclement weather drove us to Ruben's home at his kind insistence for a two-day break, cafeteria and restaurant food, chess, and bouts of roasting in front of his large fireplace. By the tenth, we were ready to get back to business, with three crews.

Jim, Tom, Joanne, and I headed to

upper Arroyo Grande up Cañon Zeta to pick off a few leads. We discovered one missed on the previous survey that led in the upstream direction to a 15-meter drop into a large room probably accessible from below. We decided to go out the Pasadizo de Flores Yeso to finish the leads 60 meters before Sibec Beyon in a small dome complex. A small infeeder was followed a few shots to a formation choke. The dry lead at the top of the domes was surveyed to a breezy breakdown choke above Sibec Beyon. In all, 313 meters were added.

Chris, Mark, Fred, and Peter returned to leads in Queso Grande, first surveying a shallow sediment-choked pit in the floor of the main passage, They then found a windy infeeder to survey, fairly low and seemingly endless. They turned back after forty-seven stations and 390 meters, where the passage lowered to less than 0.5 meters, with a stream and still plenty of airflow.

The trip of the day was a return to La Poza. It was suspected that the stream that sinks in Cañon Zeta of upper Arroyo Grande would resurge in La Poza. When the previous survey of La Poza had been plotted up, the passage had headed toward Arroyo Grande. Joining Matt, Don, Liz, and Ruben were Michelle Comstock and Jerry Wilson. They continued beyond the pool and waterfall climb that stopped us on the first trip, surveying an additional 203 meters in twenty stations, to an area of breakdown that was pushed upward 20 or 30 meters through several rooms with an overhanging wall. Little did they know how close they really were to connecting. Later, after a surface survey, we found they had put their last station 24 meters directly below the survey line through the upper Arroyo Grande borehole across from the entrance to Cañon Zeta.

February 11, Joanne, Fred, and I investigated a shallow doline that we walk by on the trail to upper Arroyo Grande and discovered 10-meter and 40-meter pits and a shallow sandstone maze cave.

Peter, Chris, and Mark pushed upstream Sibec Beyon, adding another 245 meters to Arroyo Grande and yet another small, windy lead.

Don, Tom, Liz, and Matt did the unusual, a dig in the bottom of the upper Arroyo Grande borehole at a point where a stream was heard. They broke through and pushed downstream about 400 meters with much air to a breakdown choke. The upper section was found to be confining, but after about 200 meters, the passage became 5 to 15 meters wide. Something did not feel right for a connection to La Poza, and it was trending too far in the wrong direction. They returned to the dig and pushed upstream, and, through a few short squeezes at the end, they found themselves at the stream-sink point in Cañon Zeta. Where does the water in La Poza come from?

The next day, February 12, Joanne and Miles returned to the previous day's pit discoveries with Peter. The clean, but damp 40-meter pit led to a short passage ending at a waterfall downclimb into the Cañon Zeta, adding another 198 meters.

Meanwhile our host Juan Díaz López remembered a nearby entrance and guided Fred, Ruben, and Jerry Wilson to it. The impressive entrance was too much to leave without checking. The passage reduced to a sandy crawl, which obviously sumps in the rainy season. Water flows up 4 to 5 meters into a large room, where it dumps its sediment. They found no way on, despite the very noticeable breeze that flows out of the crawl. They guessed about 100 meters of cave was seen.

On the day's third trip, Don, Tom, and Chris surveyed from upper Arroyo Grande along our access trail and tied in to a concrete power pole in town near our camp. The intent was to run a survey line down to Cueva de La Poza, which was done the next day. Tom, Don, and I had to halt the survey to give right of way to a passing swarm of bees.

Also on February 12, Liz, Peter, and Matt surveyed the downstream discovery from Cañon Zeta to the choke, 485 meters in 52 stations.

On our last day, Fred, Tom, Joanne, and I dropped the 10-meter pit we had found near the 40-meter one. Two passages led off the bottom, which was littered with empty, but obviously used, church pledge envelopes, prompting the name Sima del Diezmo Robado. The most inviting lead went to a small room with a 40-meter-deep slot in the floor, obviously connecting to the passage off the bottom of the 40-meter pit and Cañon Zeta. We surveyed the smaller side-lead, which trended in what we thought was an odd direction, north, away from the lower Z survey. It went downstream and got progressively smaller and muddier. We turned around after a total of 216 meters and forty-six stations. When a line plot was made, it showed the passage was trending straight for the upper entrance to Arroyo Grande.

The trip's survey brought Arroyo Grande to 6890 meters and Queso Grande to 1750 meters, plus Cueva de La Poza to 575 meters and small new caves totaling 70 meters. We accomplished all our goals and developed new ones for the following year.

Jim, Joanne, Ruben, and I were the only ones returning in 1992, what with a conflicting Cheve trip run by Matt that also took Don, Chris, and Peter. Dave West and Karen Willmes from Maryland and Don Glasco from Virginia were recruited. Several objectives kept us busy for the two weeks. First, we wanted to increase the length of the Arroyo Grande system as much as possible, to make it

Upper Arroyo Grande borehole. *Miles Drake, Don Glasco, and Jim Pisarowicz.*

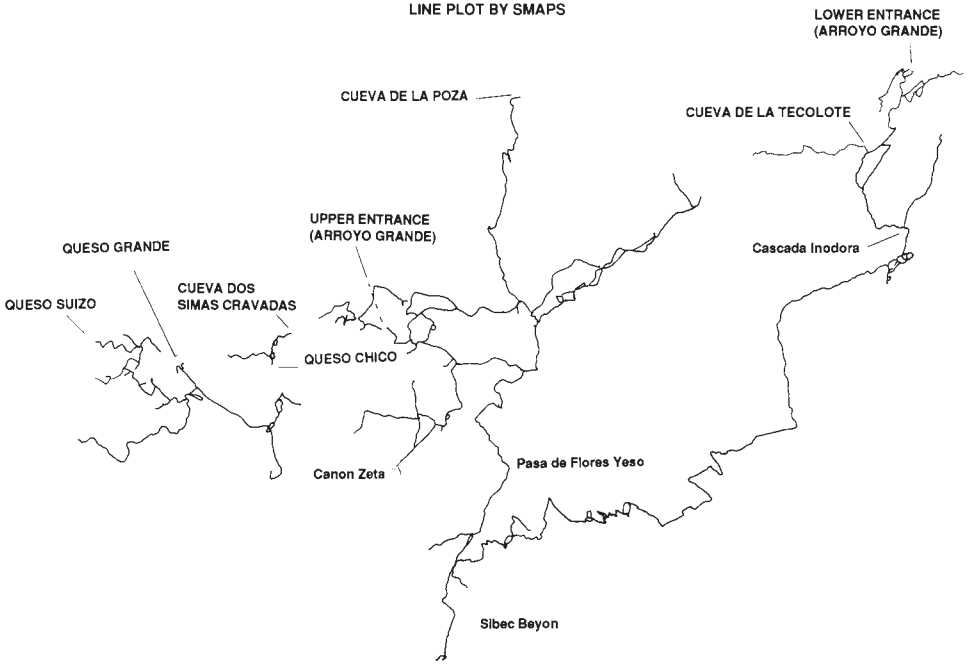
CUEVA DE ARROYO GRANDE AND OTHER AREA CAVES

CHIAPAS, MEXICO

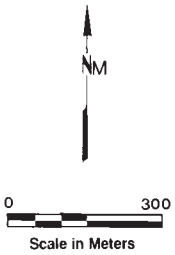
COMPASS & INCLINOMETER SURVEY

Chuck Allen	Peter Haberland
Liz Canning	Matt Oliphant
Mark Crapelle	Jim Pisarowicz
Michelle Comstock	Mike Sellars
Ruben Comstock	Joanne Smith
Don Coons	Chris Welsh
Miles Drake	Dave West
Sheri Engler	Karen Willmes
Don Glasco	Jerry Wilson
Fred Grady	Tom Wilson

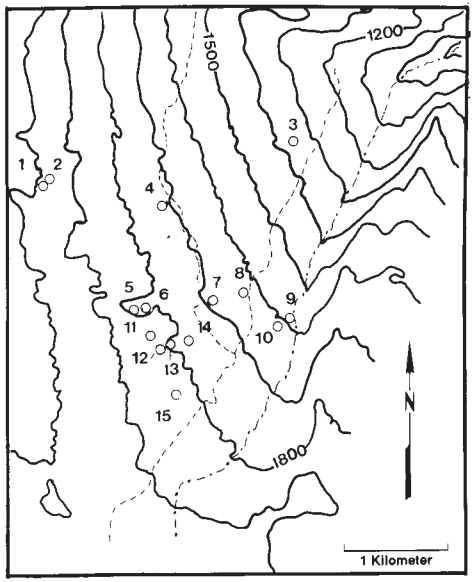
LINE PLOT BY SMAPS



Kambesis 1992



1 SIMA EL CEDRO
2 SIMA DOS PUENTES
3 SIMA DE JOCONUSCO
4 SOTANO DE ARROYO GRANDE (283 METERS)
5 CUEVA DEL NIDO
6 CUEVA DE LA ARACHNAS GIGANTICAS
7 CUEVA DE LA POZA
8 SIMA DE KAREN
9 ARROYO GRANDE (LOWER ENTRANCE)
10 CUEVA DEL TECOLOTE
11 QUESO SWISSE
12 QUESO GRANDE & QUESO CHICO
13 CUEVA DOS SIMAS CRAVADAS
14 ARROYO GRANDE (UPPER ENTRANCE)
15 CUEVA DE FREDERICO



Entrance Location Map

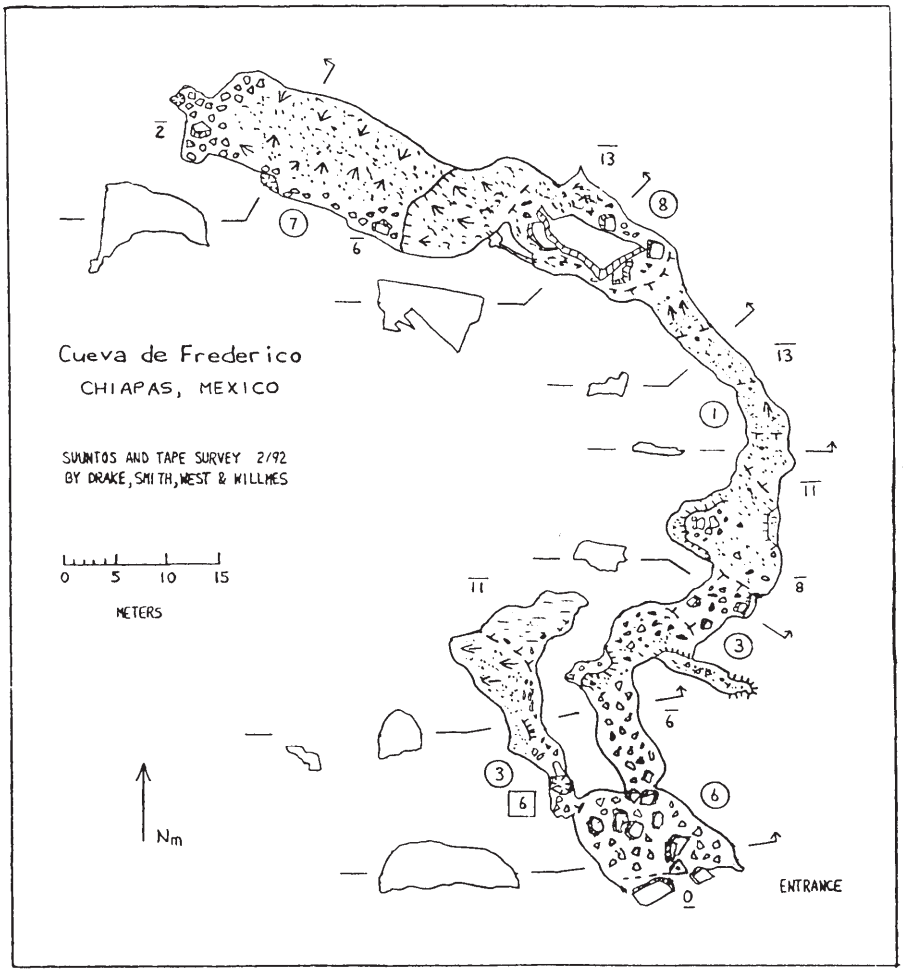
one of the ten longest in Mexico. This could easily be done by connecting to Cueva de La Poza, Queso Grande, or Tecolote. Queso Grande needed much more work in both upstream and downstream leads. Last, we needed to ridgewalk the adjoining areas to find other entrances to the system.

On February 17, 1992, our second day in Chiapas, the six of us did a thorough search along the upper Arroyo Grande borehole for any leads down to Cueva de La Poza, without success. If a direct connection is ever to be made, it will more likely be made by digging up from the La Poza side. The next day Joanne, Karen, Ruben, and Dave pushed the first downstream lead in Queso Grande through breakdown to a stream canyon. Tremendous airflow indicates much more cave beyond a guillotine rock that forces one to swim. Perhaps this connects with La Poza. Because of the slick, black-varnished rock, this was named Arroyo Negro. Another 143 meters was added to Queso Grande.

Don, Jim, and I did a surface recon near the Queso Suizo end of the system. Our first discovery was Pozo de Queso, 33 meters deep, which was within 5 meters of the main trail; Don and Jim surveyed it later in the week. We also made our way down into the very large karst feature to the north, which we called Dolina Gigante. This elongated doline has cliffs for much of its length and terminates in cliffs on the ends. As we made our way along the south slope, we noted streams flowing down from the base of the cliff. We found two resurgence caves, the larger of which we surveyed; Cueva de las Arañas Gigantes is 145 meters long. We then chopped down to a cornfield and found a trail to take us up and out.

On February 19, Karen, Dave, and Joanne found a crawl at the headwall opposite the upper entrance of Arroyo Grande. They spent eight and a half hours for a total of 183 meters, stopping short of a three-second pit and an upstream, wet bellycrawl. This was so inviting that no plans were made to return. Outside, just below the entrance, was a two-second pit, so they decided to call this Two Pit Crawl Cave (Cueva de dos Simas Cravadas). Meanwhile, Jim and Don dropped Pozo de Queso and found it dead, and I joined them later to check out sinks to the east of Dolina Gigante. We did find one real cave, 75-meter Cueva Fractl, which we sketched.

The next day Jim and Don were ready for a hard day, and so they tackled some



remote leads in Arroyo Grande's Sibec Beyon with Ruben and his brother-in-law Mike Sellars from Tennessee. They got 144 meters and discovered a passage with selenite swords, butterfly formations, and nice gypsum flowers.

Dave, Karen, Joanne, and I headed for lower Arroyo Grande to finish off leads starting near the entrance. Dave, following the air in a narrow fissure, climbed up into tight breakdown and saw light. Within minutes, he dug his way into the entrance room of Cueva del Tecolote. After surveying the connection, we continued with other leads further in, for a total of 311 meters.

Returning to lower Arroyo Grande on the twenty-second, Karen and Joanne both found different ways down to a significant downstream lead right at the entrance. We spent a long day ridgewalking instead, and found two pits, Sima de Karen, 20 meters, and an unnamed 40- or 50-meter pit, both near major trails.

Jim and Don returned to Dolina Gigante with Dave to locate more caves. After considerable poking, they located another resurgence cave along the south face, Cueva del Nido, and surveyed it to a length of 152 meters, to a breakdown choke. On the way back to base, they saw what they named the Railroad Tunnel high in the cliff at the eastern end of the doline.

February 23, we all participated in getting to the Railroad Tunnel. The problems of an overhanging roof above and unclimbable cliff below were solved by proper rope location, aided by two-way radios. Don was the lucky one to first descend to the short but difficult climb up to the end of the shadow. We even caught most of this on video.

The next day, Don, Jim, and I returned to lower Arroyo Grande to finish off the remaining leads in the F survey. This disappointing trip only yielded 110 meters before we ran out of leads. One exciting lead at Cascada Inodora required a longer rope than we had with us. Originally, it was thought that the F-survey stream that went down this 4-meter pit probably resurged 100 meters inside the entrance. This year, the volume of water

entering the pit was considerably more than that at its supposed resurgence. The water clearly went elsewhere.

Meanwhile, Joanne, Karen, and Dave surveyed the downstream leads near the lower entrance of Arroyo Grande that had been discovered on the twenty-second. This turned out to be the stream that connected to that resurgence. They found a lower tube descending at a steep gradient that had a walkable ceiling channel. They encountered several infeeders, but finally lost the stream in a breakdown choke. They got 292 meters and established a new depth for the system.

February 26, Jim and Don tackled Cascada Inodora in lower Arroyo Grande. A bolt was placed to clear the waterfall, but the 4-meter pit could be freeclimbed out, in the water. A 1-meter-by-3-meter clean-washed canyon sloped at about -8 degrees to the north-northeast for 191 meters, where they were stopped by a 5-meter waterfall pitch. Jim named this 8K Canyon, as it put Arroyo Grande over 8 kilometers long.

Meanwhile, as a reward for surveying enough tough passage, I guided Dave, Joanne, and Karen to Cueva de Frederico, which had been shown to Fred Grady in 1991 by our host. This very pleasant 163-meter cave has a lot of air, which issues from terminal breakdown, and abundant cave life. Dave and I dug for a couple of hours. It was Dave who discovered a squeeze at the entrance that led to a short lower level. Although Frederico has not been tied in by surface survey, it is a likely guess that this is the primary source of the water in Sibec Beyon.

On February 27, Jim and Don returned to Cascada Inodora with Dave for the big push. They rigged the 5-meter drop back from the edge with a 15-meter rope and a pad and descended to the top of an even wetter 2-meter waterfall. Don belayed Dave down to a sump that might be dry by April, later in the dry season. Having had such a short trip, they had plenty of time to set up a slide show for the villagers. Ruben presented it three times, to about two hundred people.

Karen, Joanne, and I missed the show, as our leads kept going. We went to a point about half way between the upper and lower entrances to Arroyo Grande and surveyed several cut-arounds and one gypsum maze, for 166 meters. There are even a few climbing leads left. We returned to camp fairly late, to find Jim had left for home with his four-by-four. It started to rain.

By morning, only heavier trucks were making it over the ridge. We hoped the road would dry out during the day. We all went off to look at Sima de Karen, in weather that could be described as heavy mist. The pit is only 30 meters off the trail to Soconusco. After rigging the 20-meter pit, Karen got to go down first. We waited while she checked out horizontal passages at the bottom, and then Don and I followed. Two walking passages were found to end within 100 meters, but a third opened into a 15-meter drop. Something for next year.

The rain came back and closed the road. The next day we hired a couple of horses and muscled the rest of our gear over the ridge to Solistahuacán.

The area in which we have concentrated our efforts measures 1 by 1.7 kilometers. We have surveyed 8334-meter-long Cueva del Arroyo Grande and more than 3200 meters in other caves. All of these caves seem to be perched on several sandstone layers, as can easily be seen in a dip-oriented profile on the maps.

Elsewhere in the valley there are deep shafts that penetrate these layers to undiscovered systems. The lack of surface streams and springs below 1600 meters suggests that all the water entering the hydrologic system resurges at one spring at an elevation of about 950 meters. With known shaft entrances at 2000 meters, the potential is good for deep systems. So far, our emphasis has been on surveying one system, but it is unlikely that Cueva del Arroyo Grande is the only one, with more than 20 square kilometers left to check. We plan to return next February, with perhaps a second trip in April.

Upper Arroyo Grande, in the B survey. *Dave West.*

We would like to thank all of the members of the expeditions for their continued support and individual sacrifices, and also Doug Dotson for donating SMAPS software, Bob Hoke for computer wizardry, and Pat Kambesis for cartography.

Expediciones al Arroyo Grande 1991 y 1992

El Arroyo Grande es un valle de caliza en al estado de Chiapas, cerca de Pueblo Nuevo Solistahuacán. La cueva mas grande de la región es Cueva del Arroyo Grande. En 1991, la entrada superior e inferior fueron conectadas midiendo así 6890 metros de longitúd. En 1992 se conectó con la Cueva del Tecolote, incrementando su longitúd a 8334 metros. Además se topografió sobre tres kilómetros en otras cavernas adyacentes. Sin embargo el área se encuentra aún inexplorada.

CUEVA DEL TECOLOTE

THE 1991 AND 1992 EXPEDITIONS

Peter Sprouse
Proyecto Espeleológico Purificación

By 1990, ten years had passed since we began the PEP survey of Cueva del Tecolote. At age ten, many lengthy caves begin to slow down, but Tecolote, it seems, has a fondness for growing in size as we get farther in. The 1990 and 1991 expeditions made major extensions, resulting in an excellent lead menu for the upcoming 1993 effort.

Tecolote is situated in the eastern part of the Purificación karst area northwest of Ciudad Victoria. The 22-meter-high entrance takes an arroyo that drains several square kilometers of land around the Ejido Los San Pedros. The cave proceeds down a series of short drops connecting segments of clean-washed streamway to a depth of 200 meters. At this point the cave flattens out in a sprawling complex of boreholes and mazes.

Since its discovery in 1973 by Charles Fromén and cavers of the Greater Houston Grotto, only a few hundred meters had been explored prior to the beginning of the PEP survey in 1980. The cave grew steadily in length through the 1980s, and in 1989 we decided to establish the first underground camp in the cave. Camp I was 1700 meters in, at a depth of 200 meters. It was a successful venture, with 4104 meters of new passage surveyed. We discovered a major new stream trunk called the Chihue Frihue, which was headed toward the presumed resurgence ten kilometers away. (See *AMCS Activites Newsletter* 18.)

In comparison to the 1989 effort by thirteen cavers, in 1990 we were undermanned, with only six cavers at the beginning. Our initial team consisted of Val Ellis, Ray Keeler, Jack Kehoe, Jack "Solo" White, and me. As we packed up for our rigging and supply trip on 5 March, John Greer showed up and decided to join us on the supply run. Rigging as we went, we reached camp in 5.5 hours with twenty-kilo duffels. We dropped our loads and started the trip out. The cave was dry and appeared not to have flooded since 1989. After this fourteen-hour trip, Val and John decided to head back to Texas rather than proceed in to camp. The other four of us went in to Camp I, with plenty of elbow room in the 60-meter-long camp room.

On 7 March we began our surveys. The four of us set off for the Millennium Falcon, where we rigged Peter's Alpine Slide. A number of years before, Peter Keys had taken an unintentional slide down this steep mud slope. We mapped down in a sizable borehole, but it soon got small and sloped down to a muddy terminus. We returned to the Fantasia Borehole and the site of my arm-breaking fall the year before. The tape showed that I had fallen 6.1 meters. Then we went to a climbing lead at the end of the Fantasia Borehole. We lassoed a horn, and Ray ascended, only to find that it ended by looping back in below. Then we moved on to a left-hand crawl farther in, It's a Dig, which soon pinched. Finally, we mapped in the Mickey Mouse Maze area. We did the Unreel Loop from the Power Nap Passage to the Yucky Poodle Trunk, and made two more loops besides. We got 294 meters in a thirteen-hour trip, making the cave 17,954 meters long.

The next day we woke at 12:30 PM and got off at 5:00. We set off for a lower-level lead below the Major Abyss called Mumble-a-Bit Pit, a muddy drop explored the year before. The passage at the bottom had been mapped for some distance to the left. This time we surveyed to the right in a nice walking passage, muddy as always. Before long we needed a handline to descend a muddy flowstone climb. Below that, it went a ways before pinching in a tight fissure. Ray left one small crawl going. Then we went into the left passage to pick up the survey at station TEA11. Although this was also a crawl, at least it was straight and clean, free of the nearly ubiquitous mud. It ended in breakdown after 60 meters. In all we mapped 180 meters in an eight-hour trip.

Obviously the stuff close to camp wasn't yielding much survey, so we knew it was time to go the distance to the Chihue Frihue. So the next day we loaded up our wetsuits and set off at 5:00 PM. It took 1.5 hours to get to Nonad Lake. We shot photos up to the Weird Place, resurveyed two loops in the dry bypass, then went on to the end of the Frihue. We mapped the 50 meters of swim that Solo

Paul Ibberson (left) and Jon Beaven light up the Forking Borehole. The floor consists of eroded flowstone blades. *Peter Sprouse.*

had explored beyond the end of the previous survey limit, deep and black water, then over a hill to the last lake he'd seen, a 17-meter swim. Then we were into dry borehole with numerous side leads. This was obviously a distinctly different section of the cave, which we named Megaland. On the left were two leads where the water may drain, and on the right was a borehole that Jack checked for 200 meters. Ahead we mapped into a large complex zone with spiny Tamabra Formation blocks that had dropped from the ceiling. A 20-meter-wide lead could be seen high on a shelf on the right side. We shot a few stations more to the Throne Room, where it got complex. Solo checked 40 meters ahead to a vertical chimney.

We opted to backtrack to Jack's borehole lead for easier meters. We reeled off steady 20-meter shots in the large Forking Borehole. Walking-size side leads were passed with regularity. High mudbanks flanked the walls. Ray stretched out for a nap, while the rest of us mapped another 200 meters. We turned around weary, but lead-rich. We'd mapped 900 meters, to make the cave over 19 kilometers long. It was four hours back to camp, and a seventeen-hour trip in all.

We got back to camp at 10:00 AM on the morning of the tenth and slept until evening. As anticipated, John Fogarty and Susie Lasko showed up, and we visited with them quite a while. At 4:00 AM on the eleventh, Ray set off for the surface for some replacement boots. We slept, then got geared up for a short trip. Ray got back just before we left, but decided to stay in camp while we went to the nearby Spine Line, shooting photos and mapping several short passages.

On 12 March we set out with two teams for Megaland. We made it to the water in one hour, and to the end in three. Solo, Ray, and I split off and checked two left leads which ended. Next I found a way up onto the 20-meter-wide shelf I'd seen before, and reached a steep climb. Ray got up and rigged a sling for us. This got us into Easy Meters, a nice level borehole. After 60 meters it split, with the right lead, The Stroll, going 30 meters to a tricky climb. Left went another 50 meters to a drop into borehole. To the right, a crawl was mapped for 30 meters, then explored by Solo for another 30 to a pit.

We then backtracked to the sling and were preparing to leave this area when I suggested to Solo that he should check a crawl visible up a slope. As he approached it, I realized that it was actually walking passage and was farther away than I had thought. Solo called back "Yup, It's Another Borehole," and so we named it. After 100 meters, it hit a large room, the Cone Karst Room. At the north end was an abyss, across which could be seen a continuing passage. At the south end was a pit, also with a continuing passage at our level on the other side. All of the pits we found in this area plotted out to be directly above the Forking Borehole, and no doubt drop right into it.

Solo wanted to go back to the Throne Room area, presumably the downstream route toward the eventual resurgence. We mapped ahead into a zone of complex flowstone cascades. Numerous routes dropped to water down pits for which we lacked rope. Ray climbed up into a higher borehole that we mapped for 60 meters to two pits. Then we had to go back to meet the others, having mapped 676 meters. Susie, Jack, and John had gone up the Forking Borehole and mapped to the right, into the spiny Great Godzilla Way. This was another large, muddy borehole. Eventually it ended, but they had numerous side leads left. They followed one lead to the left, connecting it back to the end of the Forking Borehole. Another, at station 183, was a large trunk, which remains unexplored. They mapped 517 meters, and our day's total was 1193 meters, for a cave total of 20,341 meters. We got back to camp at the end of a seventeen-hour trip.

The next day was reserved for rest and celebration. We partied and ate a pie, which John had decorated with the inscription "T 20" to commemorate the passing of the twenty-kilometer mark. On 14 March, Jack, Susie, John, and I went out to Goofy's Borehole in the Standing Room Only area. Checking a high lead, I immediately found borehole, which we named the Gargoyle Gallery. We mapped through this mazy section, pushing through to Slimy's Pit. We followed John down this mucky overhang and mapped to the left in Grumpy's Borehole to a blowing lake, Snow White's. John waded in and explored to another lake that we would need an etrier to drop into. The other way in Grumpy's Borehole led to a tricky canyon over water. We retreated to Gargoyle Gallery and mapped loops until John wandered way off checking leads and ran out of light. He made it back a bit rattled, and we headed out. John slipped while descending the Gargoyle Climb and got a bad gash on his ribs.

Meanwhile, Ray and Solo had gone down into the Galactic Trash Compactor below Camp I and pushed it 45 meters to a pinch. Then they went up to Paul's Passage and mapped up the terminal mud slope. They tried to get up the other mud slope at the Major Abyss, but couldn't. So they went to photograph the Goddess of Liberty and the Dam Side Passage. The day's total survey was 522 meters, making the total survey for the expedition 3136 meters, and the cave

length 20,796 meters, the fifth longest cave in Mexico. On 15 March, our last full day in camp, we went out to shoot big photos in the Fantasia Borehole. We first spent thirty minutes and used forty-nine M3s doing a 200-meter shot down the passage, then did one more of half of the length of the best part. Once back in camp, we packed up gear we could spare and hauled it up above the Ides March. Solo set up his private camp in the Ides, while the rest of us returned to Camp I.

The next day we lingered over tea, then packed up our duffels and split from camp. We had a good trip out, partially derigging, and pulled the remaining ropes the following morning, before driving back to Texas. So ended the second occupation of Tecolote's Camp I, and it was clear that the next trip would have to be to a Camp II.

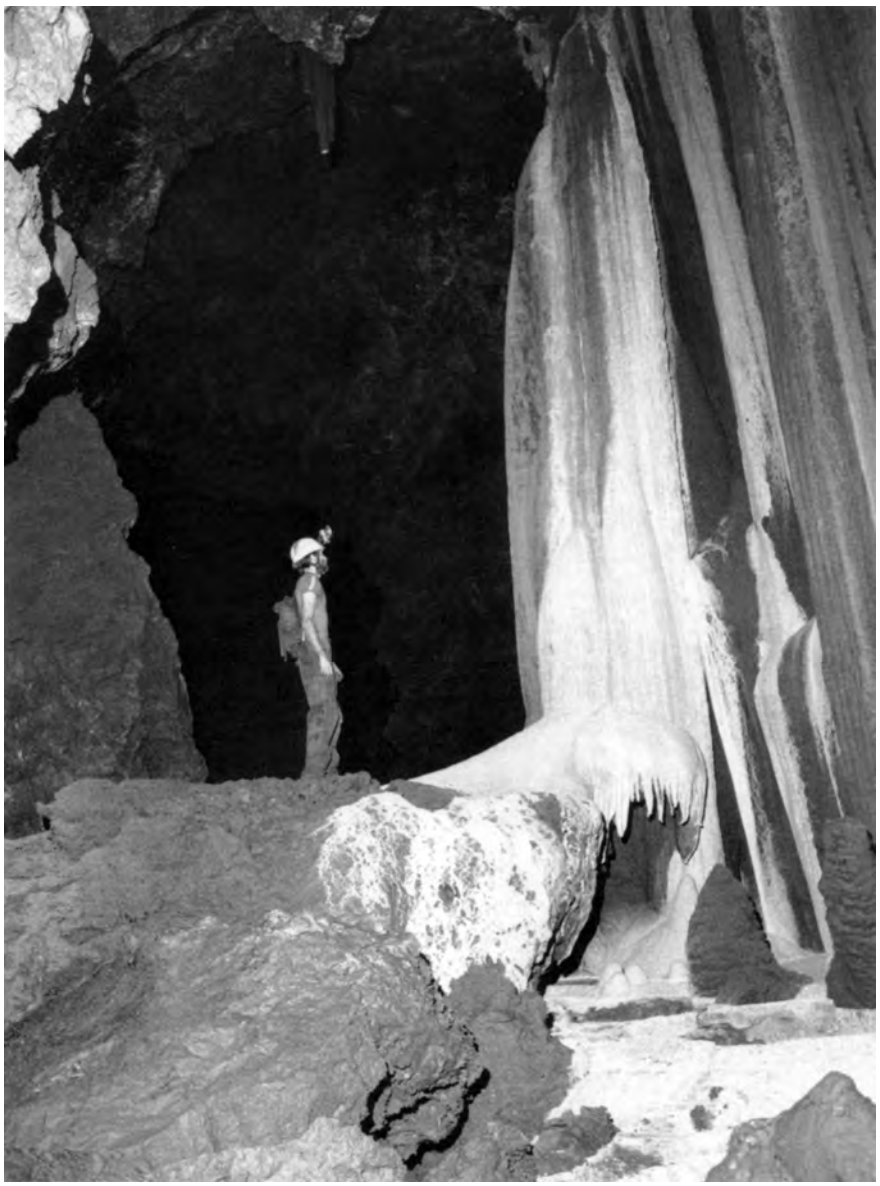
For the 1991 Camp II push far inside Tecolote, we assembled a team of thirteen cavers: Paul Ibberson, Dave Savage, and Jon "JJ" Beaven, all from the United Kingdom, Dale Chase and Steve Grundy from Canada, and Val Ellis, Cyndie Walck, Scott Scheibner, Ray Keeler, Jack Kehoe, Peter Quick, Solo White, and I from the United States. We arrived at the cave entrance on 2 March, and the following morning sorted rope and packed gear for the supply run. We got off at 2:40 PM and rigged down the Tecolote entrance series, picking up stashed supplies at Camp I. We got to the Mud Funnel after seven hours' travel and dropped our gear.

The next day we concentrated on absorbing solar radiation, and that evening we showed Tecolote slides to about seventy villagers, using Ray's portable generator for power.

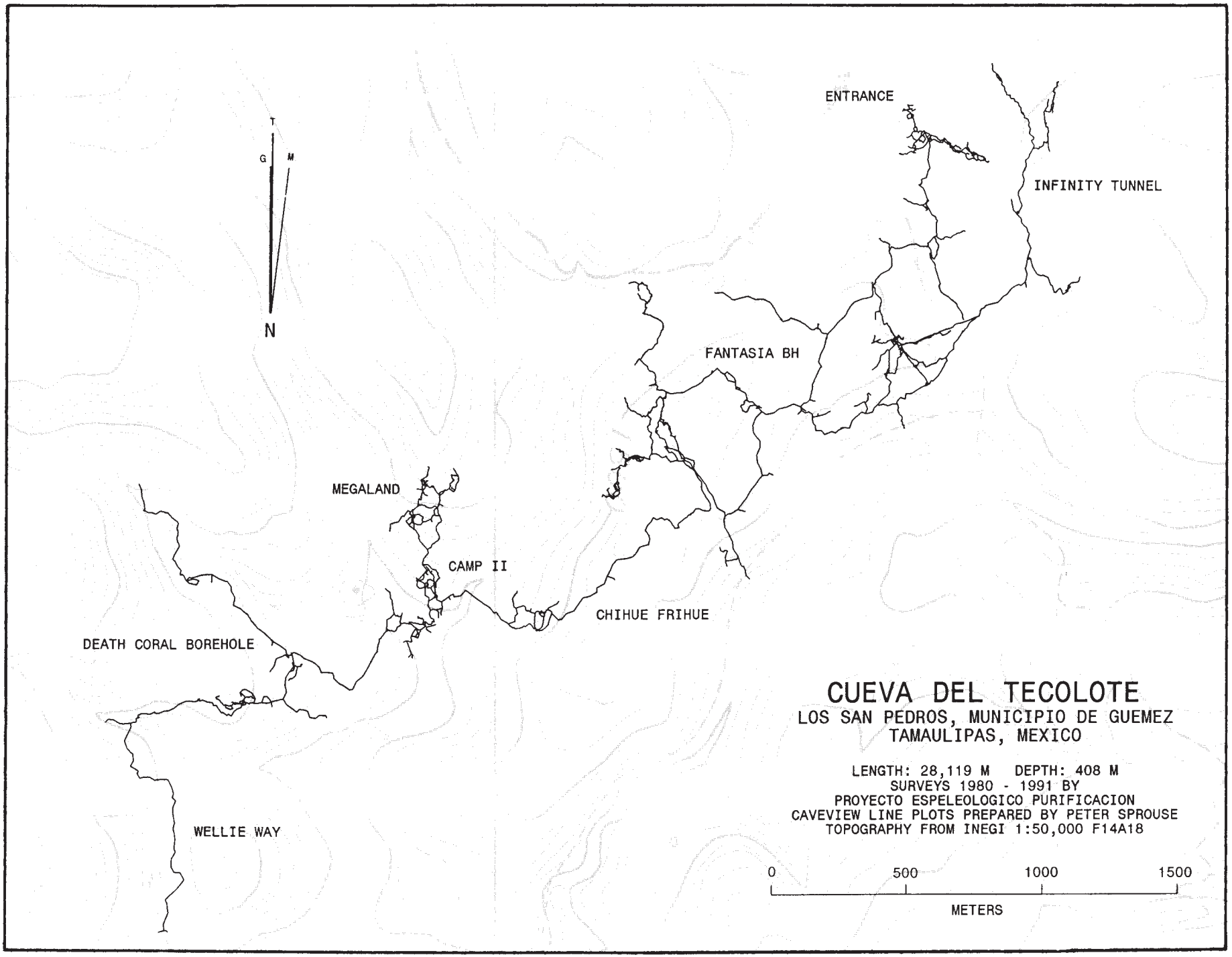
On 5 March we packed up our final duffel loads. Cyndie and Peter decided to wait outside a day due to mild illnesses. The rest of us headed in and moved steadily out to the drop-off point. I led on through the Chihue Frihue with JJ, Dave, and Steve. The swims were easy with duffels, but fatigue was setting in by the time we found camp. We tried to find a suitable camp in the Forking Borehole, but ended up going up the climb to Easy Meters. Our camp had ample floor-space, though it was a bit muddy. Everyone straggled in after the eleven-hour duffel haul, ate, and crashed. Camp II seemed unusually warm, with little need for polypro clothing.

We got the usual slow start for our first survey day. Paul, Dale, JJ, and I went up the Forking Borehole to the Research Boulevard lead at the 183 Intersection. We went up it for 50 meters to where we were stopped by a steep mud slope. A lower level took us through a complex Tamabra maze, the Research Maze, to intersect a large borehole. To the left we mapped about 100 meters to a drop, which probably connects back to the mud slope we'd been stopped by in Research Boulevard. To the right we mapped up to an overhung lead climb, with the borehole continuing above. We then backtracked to the 183 Intersection, mapping a short loop and then a longer one, Little Bambi Ways I and II. Our team's survey for the day was 407 meters.

Ray's team included Solo, Steve, and Dave, and their objective was the drop below the Throne Room. This short drop went immediately to a swim, so they retreated back to the top of the drop to look at a crawl Ray had been in the year before, but it ended. Backtracking a bit more, they did the short climb up to the high borehole that we'd mapped the year before, the King's Gallery. There they checked a hole under a large block and found a route back down to water level. They mapped a series of mud-floored passages and a small streamway to a sump, but couldn't regain the main drainage route. Their day's survey was 323 meters. Meanwhile, Jack, Scott, and Val had gone back to the drop-off point to get gear, and they met Peter and Cyndie coming in. They trickled into camp that night. In all, we had mapped 730 meters



Scott Scheibner views "Best in the Cave" formation in the Standard Borehole Unit. *Peter Sprouse.*


T
G
M
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ENTRANCE
INFINITY TUNNEL
FANTASIA BH
MEGALAND
CAMP II
CHIHUE FRIHUE
DEATH CORAL BOREHOLE
WELLIE WAY
CUEVA DEL TECOLOTE
LOS SAN PEDROS, MUNICIPIO DE GUEMEZ
TAMAULIPAS, MEXICO
LENGTH: 28,119 M DEPTH: 408 M
SURVEYS 1980 - 1991 BY
PROYECTO ESPELEOLOGICO PURIFICACION
CAVEVIEW LINE PLOTS PREPARED BY PETER SPROUSE
TOPOGRAPHY FROM INEGI 1:50,000 F14A18
0
500
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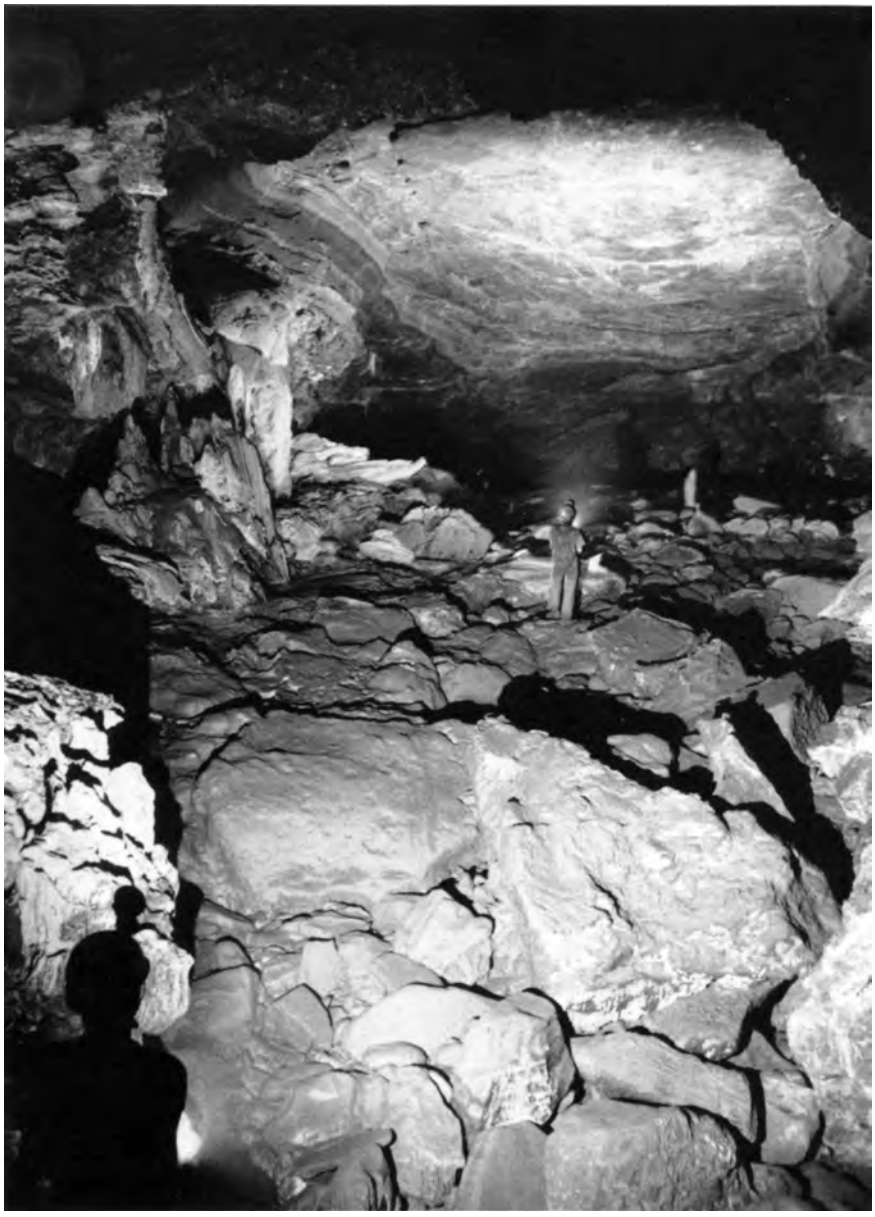
that day, making the cave 21,526 meters long.

My team on 7 March was Peter, Cyndie, and Scott. We went up into the Forking Borehole with Jack's team, which included JJ, Steve, and Dale. At a point where a left spur split into up and down leads, my team took the lower way. This led down a narrow rift to a T junction. To the right, the Spray Shot Passage went about 50 meters to a lake, which we declined to push. To the left, we climbed up to a junction, where the right-hand lead tied back into the Forking Borehole. Cyndie followed the left lead up to a steeply ascending mud slope.

Returning to the Forking Borehole, we chose a major lead up a slope that Jack had looked at the year before. We named this the Pyramid Passage for the mud dunes at the top of the hill. At a junction, we found that the left-hand way led to the top of Cyndie's mud slope, while the right-hand way continued on as the Bold Woman Borehole (where no man has gone before). This passage led to several high windows overlooking a large passage that we suspected was the Great Godzilla Way. Leaving Peter there, the rest of us circled around up the Forking Borehole to the Godzilla, confirming and mapping the tie-in. Our day's survey amounted to 388 meters.

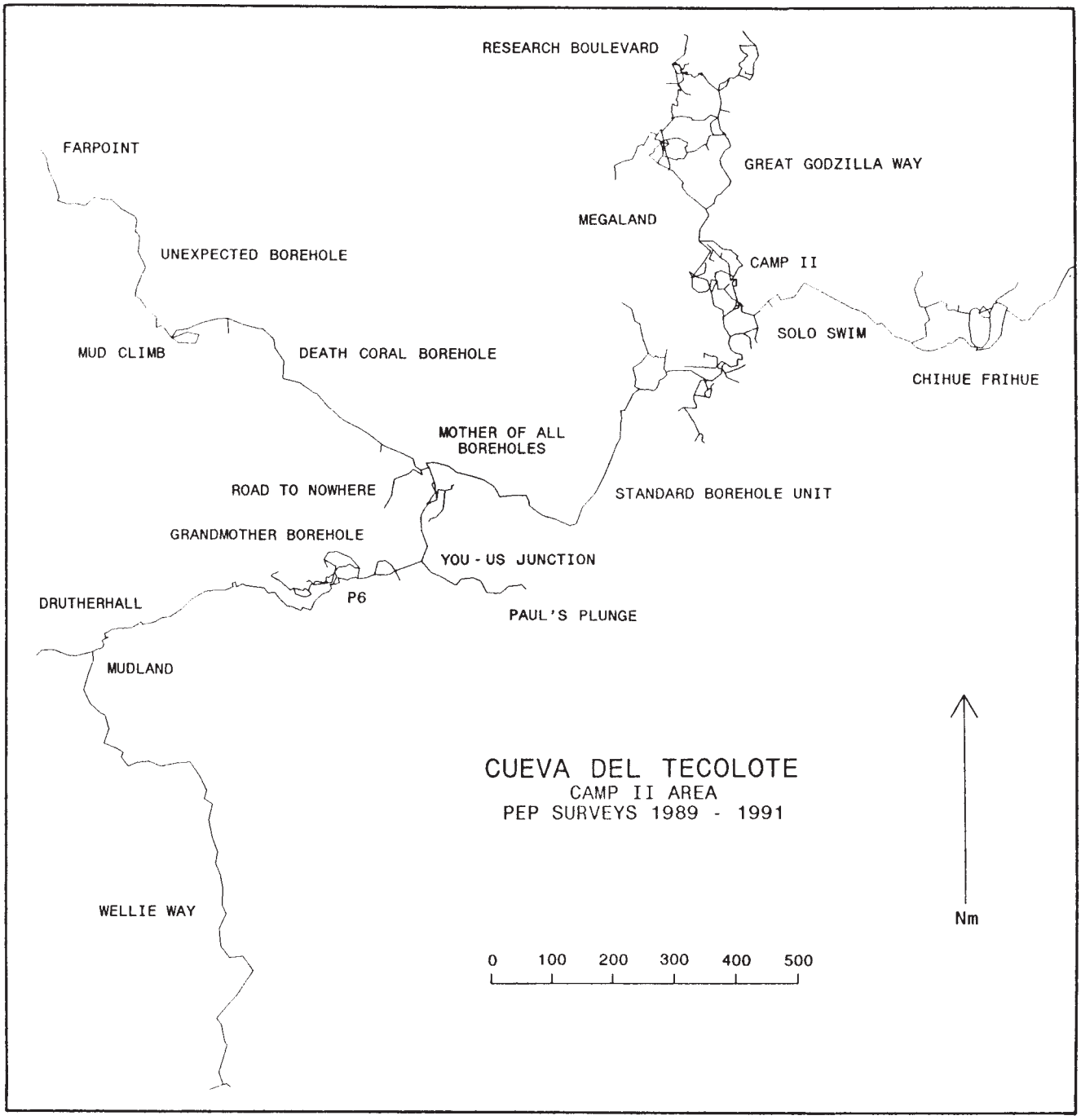
Meanwhile, Jack's team had taken the upper lead where my team had gone down at the beginning of the survey. They made it part way up a dome climb before turning back. So they went a bit farther up the Forking Borehole to another upward lead, which soon connected to the top of the dome they'd been trying to climb. It also continued on, Up Up and Away. This eventually got too steep for them, but it is a promising flowstone lead-climb for the future. Then they went back down the borehole toward camp and mapped up into the Crossjoint Lead, which led to an upper-level passage mapped the previous year, called Another Borehole. They crossed this passage, tied in, and went into another lead on the other side. At that moment I was entering camp, which was empty except for a sleeping Val. I heard voices and realized that Jack's team was coming out of the unexplored lead at the far end of camp. I hollered to them, startling Val, who thought I had come out of the virgin lead, out of his slumber. It was an amusing scene as the surveyors tied in the loop over Cyndie and Scott's sleeping bags. They ended up with 356 meters for the day.



The Standard Borehole Unit.
Peter Sprouse.

The downstream team was again led by Ray, and included Solo, Paul, and Dave. They went down the drop below the Throne Room prepared for the water. In the downstream direction they explored to a sump, and upstream they got to a flowstone choke with a dribble of water coming out of it. So once more they retreated to the King's Gallery, where Ray had noticed a high lead about 15 meters up the west wall. Paul got up to a nice oval tube, No Mud Over. This soon forked, with the right way going to a large breakdown chamber, the 747 Room. To the left was a short drop into a complex area where Paul reported a walking passage that kept on going. They netted 267 meters of survey for the day, making our day's total 1012 meters and carrying us past Sistema Cuetzalan into third place on Mexico's long list.

My team on 8 March included Cyndie and JJ, and our first project was tying the end of Easy Meters near camp into the Forking Borehole, with help from Scott, who lowered the tape from above. We then joined Peter, Steve, and Dale at the climbing lead at the end of Research Boulevard. Somehow they passed the lead on to me, and I squeaked up it on five improvised protections. At the top was a further little climb up, then a more major one that we lacked gear for. The passage at the top looked extremely promising, a major infeeder coming from the north that we need to go back to with full lead-climbing gear. We retreated to the Research Maze to do clean-


RESEARCH BOULEVARD
FARPOINT
GREAT GODZILLA WAY
MEGALAND
UNEXPECTED BOREHOLE
CAMP II
SOLO SWIM
MUD CLIMB
DEATH CORAL BOREHOLE
CHIHUE FRIHUE
MOTHER OF ALL BOREHOLES
ROAD TO NOWHERE
STANDARD BOREHOLE UNIT
GRANDMOTHER BOREHOLE
YOU - US JUNCTION
P6
DRUTHERHALL
PAUL'S PLUNGE
MUDLAND
CUEVA DEL TECOLOTE
CAMP II AREA
PEP SURVEYS 1989 - 1991
WELLIE WAY
Nm
0 100 200 300 400 500

Peter Sprouse gets a boost up a climb in Research Boulevard. *John Beaven.*

up work in breccia porosities, eventually meeting up with Peter's team, which had followed a lead off the Forking Borehole into the maze. My team got only 104 meters for the day, and Peter's got 208 meters.

Just as it seemed that our surveys were shrinking, Ray, Paul, Scott, Val, and Dave came into camp late with good news: the Mother of All Boreholes had been found. They had pushed through the 747 Maze and intersected a major north-south trunk, the Standard Borehole Unit. They mapped steadily southwest, through decorated trunk with occasional flowstone downclimbs. As the passage got bigger in massive breakdown, they stopped in the Mother of All Boreholes with 605 meters in the bag. We had a 3:00 AM camp celebration over this stroke of good fortune. The day's total survey was 917 meters, but now we looked forward to doubling that.

The next day we all set off for the new borehole, thirteen strong in four teams. At the Standard Borehole Unit we planned a double leapfrog, with two teams to the right and two left, downstream. Jack, Cyndie, and Val mapped the north, upstream extension of the Standard Borehole Unit, gaining 188 meters before it ended abruptly. That left the upsteam leapfrog team of Peter, Dale, and Steve with only a small, spiny side lead, which looped back to the 747 Room; they named it the Porcupine's Arsehole. While Ray's team continued mapping south from where they had left off at the Mother of All Boreholes, Paul, Scott, and I leapfrogged ahead down the large truck for several hundred meters to a T junction. We set a station marked with arrows which read "you - us," and we mapped into the left-hand borehole. This was a nice gravel-floored inlet with occasional pools and climbs. After 218 meters, we were stopped by a swim, which Paul tried to traverse around, but he fell off into the water, giving the name Paul's Plunge. We returned to the You-Us Junction as Ray's team tied in his 237 meters of survey down the Mother of all Boreholes. Some recruits from the upstream teams filtered down also, looking for work. Ray, Scott, and Solo went back uphill to pursue a westward lead that Scott had seen. It turned out to be a straight and level trunk over 600 meters long. They stopped in the Death Coral Borehole at a tricky mud climb up. Peter, Steve, Dale, and Dave "Probe Unit" Savage leapfrogged ahead of my team into the You-Lead, while my team mapped their tracks. They began their survey about 200 meters ahead at a lake, sparing us the wade. They then followed a flowstone passage down and down, then up a ramp in the large Drutherhall ("druther it was all like this"). They halted at a wall climb with a breakdown maze at its base, netting 476 meters for their day's work. Meanwhile Cyndie, Paul, and I mapped toward their tie-in, doing a nice borehole loop and going down a 6-meter drop. Just before the tie-in, we looked at a nice infeeder on the right wall, but couldn't quite get into it. Back at the top of the 6-meter drop we mapped up a big mud slope to the west. At the top was a nice passage that curved around to the left to a large mud funnel. At the bottom was only a small lead, but Paul made it up the far mud slope to a continuing borehole. I went back around to the top of the mud slope and found a passage, the Scud, joining his, but couldn't get up to his level. I could continue on in the Scud Passage, which split, with the left-hand way going to a small impassable hole in the floor of Paul's upper borehole. I went back around to the mud funnel and we mapped on into the Grandmother Borehole. We stretched the tape to the limit for a number of shots, quitting when the borehole split into upper and lower routes. Our survey was 675 meters, and the day's total was a welcome 2221 meters. We all dragged back into camp tired and elated.

A gonk day was declared on 10 March by unanimous decision. We ate, partied, and played cards, and Scott and I even did one survey shot to complete the Easy Meters to Forking Borehole loop.

As things worked out, 11 March would be our final push day, and we planned to give it all we had. Our four teams filtered out of camp and down the Standard Borehole Unit. Cyndie, Scott, and I shot photos, then mapped in the Scud Passage below the Grandmother Borehole. We connected with Jack, Dave, and Paul, whose downward lead off the Grandmother had ended in several sumpy pits. My team went back to the Mother of All Boreholes area and mapped two jug handles, Planktown and Obewon Kenobe. Jack's returning team passed us and tackled a high lead over the beginning of the Death Coral Borehole. The Road to Nowhere didn't go far, but it was a nice large passage. Scott and I were still primed, so we left Cyndie in the Death Coral Borehole and followed the footprints of Ray's team up the climb that had stopped them the day before. Once up the tricky climb, we followed their stations through a complicated formation passage. Then it opened up into a big descending passage, the Unexpected Borehole. While this passage had the usual deep silt covering the floor, occasional clean flakes spalled off the ceiling indicated that it hadn't flooded in a long while. Finally we made voice contact with Ray, Val, and Solo, to their amazement. Scott and I set off down the steep breakdown slope to leapfrog them for an hour or so, climbing up into a westward infeeder borehole. We went 100 meters to a lasso upclimb, then began our survey back, naming this remote place Farpoint Station. My team's total was 433 meters, Ray's was 532 meters, and Jack's was 261 meters. It took us three hours to get back to camp from Farpoint, making it a 17.5-hour trip.

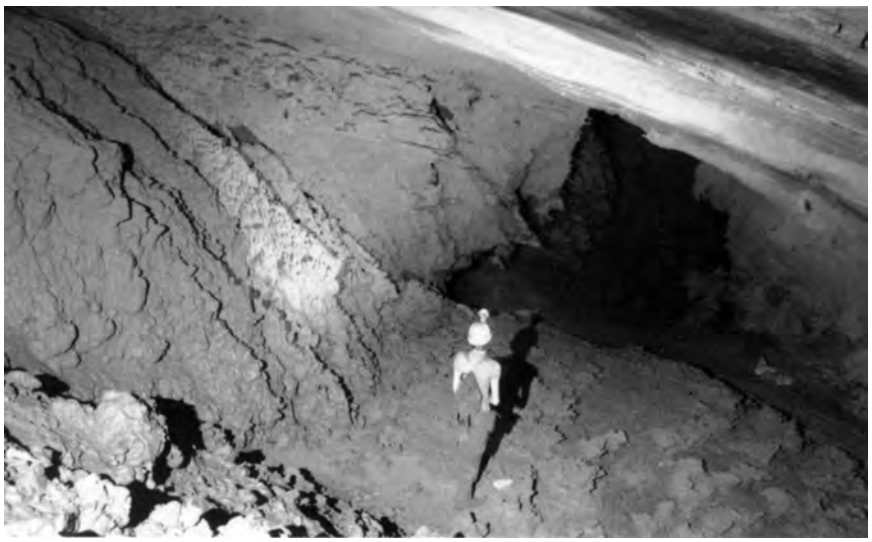
We found that Peter, Steve, Dale, and JJ were still out, and they didn't drag in until several hours later. They had mapped an amazing 1294 meters in never-ending boreholes. First they had to penetrate a grim 60-meter breakdown pile, but then they popped out into a four-way borehole intersection, known as Mudland. Peter checked a northeast borehole to see if it would come out on a balcony they'd seen above the breakdown maze, but it didn't look like it would. Another northeast borehole was left unexplored. The third way was a steep mud slope that they mapped for 100 meters to the top, where it continued as a westward walking lead. But they chose to follow the

main south lead, the Wellie Way. After only 70 meters, another borehole lead was seen going off. The Wellie Way was relentless 25-meter-wide borehole, zooming south for 1000 meters between ever-present mudbanks. Another southwest borehole lead was passed along the way, and they quit where the Wellie Way split. To the left was an infeeder coming from a 6-meter bolting lead. To the right, the main way appeared to continue downward at a steep angle. They had mapped more in a day than any PEP team ever had before, knocking our day's total up to 2520 meters. Tecolote's calculated length now stood at 28,119 meters, and the depth had increased 150 meters to 408 meters.

On 12 March we rested and began packing our duffels. Steve, Dale, and Peter left for the surface at midnight, out of sync with the rest of us. The next day the rest of us got up early for the final packing. I was in the last group with Cyndie, Scott, Val, and Solo, trudging steadily on through Camp I. We spread out in the rope series, and our trips out of the cave averaged about thirteen hours long.

With the next day's derig, the 1991 Tecolote expedition drew to a close. With 7323 meters mapped, it was our most successful ever, and our leads for the next expedition are excellent. A study of the map shows that we've advanced one third of the distance toward the presumed resurgence, and two thirds of the depth. It is now nearly an eight-kilometer trip to the back of the cave, and the next effort will be pushing the limits in more ways than one.

The PEP wishes to thank Oregon Freeze-dry Inc. for assistance to the Tecolote expeditions.



The You-Us Junction, looking east toward Paul's Plunge. *Peter Sprouse.*

Cueva del Tecolote 1990 y 1991

La Cueva del Tecolote se encuentra en la zona cárstica de Purificación al noreste de Cd. Victoria. En ambos años campamentos subterráneos se realizaron para la exploración de esta extensa caverna. En 1990, seis espeleólogos topografiaron 3136 metros, la mayor parte fue pasaje amplio. En 1991 trece espeleólogos de Inglaterra, Canada, y EEUU acamparon en un lugar más profundo de las caverna, mapeando siete kilometros de pasajes vírgenes, incluyendo 2520 metros en el último dia de exploración. La Cueva del Tecolote tiene ahora una longitúd de 28,119 metros y una profundidad de 408 metros. Muchos pasajes principales se encuentran todavía sin explorar.

EXPLORATION IN THE SIERRA JUÁREZ, OAXACA : CUEVA CHEVE 1991–92

Louise D. Hose

The 1991 efforts in the Sierra Juárez began with a winter expedition consisting of Paul Burger and Louise Hose from Colorado, Don Coons from Illinois, Bill Farr, Herb Laeger, Susan and Don Morris, Matt Oliphant, and Carol Vesely from California, John Ganter from New Mexico, and Ed Sevcik from Texas. We intended to visit the area of the resurgence for the water in Cueva Cheve, but we were never allowed near the caves, and the team divided into three groups, those who routed early only to have truck problems destroy their hopes of caving elsewhere, those who spent the entire time driving from one official to another trying to clear up the problems, and those who split their time between sitting out outrageous rainstorms in leaky tents and being devoured by biting flies while trying to dry their equipment in the lowlands. The project had five meetings with the presidente of Santa Ana Cuauhtémoc during a period of a week and a half. Some of us made three trips to Teotitlán and one trip to Oaxaca in an attempt to clear up the problem. A representative from the governor's office accompanied us twice. But each meeting ended with a request for yet another letter of permission from some state agency in Oaxaca. We ended the expedition without having done any significant caving.

After everyone else left, Vesely and Farr drove up to the upper karst and connected Cueva Escondida into the system, making it the deepest cave in the New World. The depth was 1369 meters.

In my mind, Cueva Cheve is the deepest known cave in the world. A visually positive dye trace of the water in the system demonstrated that the hydrologic system is more than 2600 meters in vertical extent. (See Jim Smith's article in *AMCS Activities Newsletter* 18.) True, cavers have physically penetrated only a little over half of the relief, but Mount Everest was the highest mountain before climbers scaled it, and some cavers think that Cueva Cheve is the deepest cave. Everyone will agree that its explored depth makes it the deepest cave in the Western Hemisphere. Naturally, its exploration is a pretty big deal. The plan in the spring of 1991 was to dive in the deepest sump in Cheve. The dream was to have John Schweyen, America's premier sump diver, pioneer a path through the sump into dry passage. Then other caver-divers were prepared to follow. The hope was that they could find a dry way back to the known cave, so exploration of dry passage could continue beyond the sump. Failing that, there were also leads in the air-filled parts of the cave. Peter Bosted, Dan Clardy, Bill Farr, and Bill Storage of California, Jim Brown and John Schweyen of New Jersey, Don Coons of Illinois, Mike Frazier, Louise Hose, and Todd Warren of Colorado, Peter Haberland and Snake Owen from New York, Matt Oliphant from Minnesota, Tina Shirk and Chris Yeager from Indiana, Jim Smith from Kentucky, Ralph Snedley and Bill, Brian, Janet, and Audrey Steele from Texas, John Stembel from Georgia, and Bill Stone from Maryland were the participants in the expedition.

Twelve cavers arrived at the Llano Cheve, the surface base camp, during the first week. Most worked hard to prepare for the dive, and it went off sooner than expected. The depressing news, however, was that the sump became more complex, tighter, and deeper than we had hoped. The dream of a simple bop through the sump into air-filled passage was shattered. Schweyen was demoralized. Even more, he was cold from his decompression stops. The next attempt would require a dry-suit and multiple bottles, all this more than 1225 meters below the lowest entrance and something like eight kilometers into the cave. But there were two pleasant results from that deep camp. The dive had made the cave 17 meters deeper, to -1386, and Oliphant had climbed into an encouraging lead a short way upstream from the sump. The cave had not defeated the cavers, it had only delayed their efforts.

The deep team did not know about the tragedy occurring elsewhere in the cave at the exact time that Schweyen was diving in the sump. The deep team left Camp III for the surface the day after the dive. When they reached Camp II, were they intended to sleep for a night, they found the note. Yeager was dead. They would find his body at the base of the 23 Meter Drop, a short way from Camp II.

Chris Yeager was a young man of twenty-five from Indiana who had been caving only a couple of years. He chose to join a party heading in to camp at the bottom of the cave for his first trip. He was part of a party of four, but, as is common in Cheve, they traveled in pairs. Peter Bosted and Jim Brown moved ahead. Haberland accompanied Yeager. Their objective for the first day was Camp II. Along the way there are thirty-two rope pitches, many with rebelays and redirections. There are also about a kilometer of river passage and several traverse lines. Yeager handled it all well until he reached the 23 Meter Drop, 4.5 kilometers into the cave, 850 meters deep, and only two drops from camp. There he made a fatal mistake.

There is about a kilometer of walking passage just before the 23 Meter Drop. Yeager was using a steel triangular screwlink on his harness, and his rappel rack was attached to the link with a single locking carabiner. It is suspected that the lock on the carabiner worked loose during the long walk between drops. Although he successfully rappelled down the predominantly sloping upper part of the next drop, when he leaned back into rappel on a free section just past a rebelay, his rack came out of the carabiner. Yeager fell about 23 meters to his death, his rack still on the rope above. Haberland ran

over immediately, but there were no signs of life. Cardiopulmonary resuscitation, ultimately attempted by all three team members, did nothing. After a night's sleep, Bosted, Haberland, and Brown climbed back out of the cave. The dive team followed a day behind them.

Yeager's father and uncle, a family friend, and two Indiana cavers joined the camp in the llano. With time, the family came to accept the decision for an in-cave burial. Eleven days after the accident, Chris Yeager was buried in sand in the large walking passage above where he fell. A tombstone was erected, and carbide soot identified the grave's occupant. Momentos from his family and a project tee-shirt were buried with him. In accordance with the family's wishes, passages were read from the Bible.

Needless to say, morale was low among the project members after the burial. Chris's family and friends left the llano on March 15. The cave was derigged, and deep exploration was suspended for the year, honoring a promise to the family.

Most of the team left two days later. Haberland and Oliphant stayed. Coons returned from Oaxaca City, accompanied by the Steeles and their entourage of family and archaeologists. Frazier, Hose, and Warren spent two days checking leads in the high karst and a day surveying in the upper part of Cheve. After Coons and Oliphant felt sufficiently recovered, we ventured over to Santa Ana. Three of us were veterans of the New Year's trip; Frazier and Warren were new. Our strategy was not to ask permission to visit the resurgence of this trip, but just to develop better relations with the folks. We wanted to let them know that we were not going to just go away. We drove away two days later feeling good about our efforts. This time, no one threw stones, no one cursed us, and we slept in town for two nights. We bought meals and Cokes locally, mapped a small cave, sampled the local caña, helped carry rocks for a new water tank, and hiked around. We do not know if we will receive permission next time, but we do know that we can safely enter the town again.

The Mexican archaeologists arrived soon after our return. Coons, Hose, Oliphant, and part of the Steele entourage spent most of three days helping with their projects in the area. It was truly a special experience. Finally, we finished derigging the cave, stashed the group gear that was left, and pretty much closed the camp. On March 29, the last Americans left Llano Cheve.

"Poor Matt—how do you plan for an expedition like this?," lamented Mark Minton in the closing line of a letter sent on January 29, 1992. Matt was Matt Oliphant, expedition coordinator for the 1992 expedition to Cueva Cheve. Project members had met the previous summer to decide on the dates for the next expedition and to outline the objectives. The dates were set for February 15 to March 15, and the main objectives were geologic investigation of the deep part of the system, continued pushing of leads in the terminal breakdown, exploration of the high karst-fields and caves, and improving relations with the people in the area. Through no fault of Matt's, the pre-expedition atmosphere was filled with confusion and uncertainty. Our well-laid plans and commitments to sponsors, granting agencies, and employers had been thrown into turmoil only two months before leaving. As of the end of January, most felt that it was unlikely that we would be able to meet most of our objectives. It was even doubtful that we would be able to enter Cueva Cheve at all. Many cavers were jumping ship. Even worse, Mark's letter described how one key member was daily changing his decision whether to go, and another refused to commit to the project, but was hinting at a mid-expedition arrival anyway. Indeed, how to you plan for an expedition like this?

When life hands you a lemon, make lemonade. It was an amazing blend of confidence, competence, persistence, and flexibility by everyone involved that brought a terrific team together at the base of the Sierra Juárez on February 16, 1992. Ultimately, the team consisted of Stan Allison from South Dakota, Manuel Aragón from Oaxaca, Peter Bosted, Dan Clardy, Lisa DeThomas, Matt Oliphant, Nancy Pistole, and Bill Storage from California, Don Coons from Illinois, Mike Frazier and Louise Hose from Colorado, Peter Haberland, Karlin Meyers, and Chris Welsh from New York, Roman Hapka and Pascal Schenker from Switzerland, and Tom Miller from Arizona. Unfortunately, there had been some roadblocks constructed to our work since our last visit, as predicted. The secretary of the jurisdiction including the Cheve area had told the advance party that he did not think we would be allowed in the cave without a special permit from the federal government. Someone from Mexico City had made this point with the presidente, the chief local official of the area, a few days earlier. As the presidente was out of town, the secretary apologized to us, but he would only allow us to establish our camp near the entrance. We were not to enter the cave.

Coons and Aragon drove off to deal with the permit, and the rest of the team worked on backpacking our supplies and establishing our home in Llano Cheve, the mountain meadow at the entrance to Cueva Cheve. Anxious to make the best of the delay, Storage, Allison, Hose, and Miller drove to the "middle karst" to hunt for caves over the middle part of the system, beyond the terminal sump. We stayed with an interesting local family.

Looking down toward Zautla. *Louise Hose.*

Pascal Schenker's Meditation Place. *Roman Hapka.*

Our host, Pedro, was a Mazatec Indian, white-water kayaker, and PADI-certified scuba diver who had studied English at Cambridge. He had also traveled to Peru, Ecuador, Guatemala, and Spain. His wife is a Cuicatec, the dominant culture of the mountains. Their hospitality was overwhelming. Pedro arranged for us to visit local caves and pits during our day-and-a-half visit. Although we did not find any potential connections to the system, the locals were very supportive, and there will undoubtedly be more trips to the area.

By the time we returned to the llano, the presidente had also returned, and he had given permission to go on into the cave. Thus, caving in Cueva Cheve began on the twentieth, when Storage and Hose started rigging and hauling supplies. Others would carry on the rigging during the following days.

Various problems caused Oliphant to decide that there would only be one deep camp this year, instead of the planned two. It would leave in a week. This left some time to fill. Storage was intrigued by a promising karst area about thirteen kilometers east of Llano Cheve. Coons had walked through the area three years before, but he found the people unwilling to talk about caves without permission from the state. The project had letters of permission. Storage wanted to keep the first party small, preferably only two people. He recruited Hose to join him, since she owned the only four-by-four vehicle available. A caver with a four-wheel-drive is never without friends.

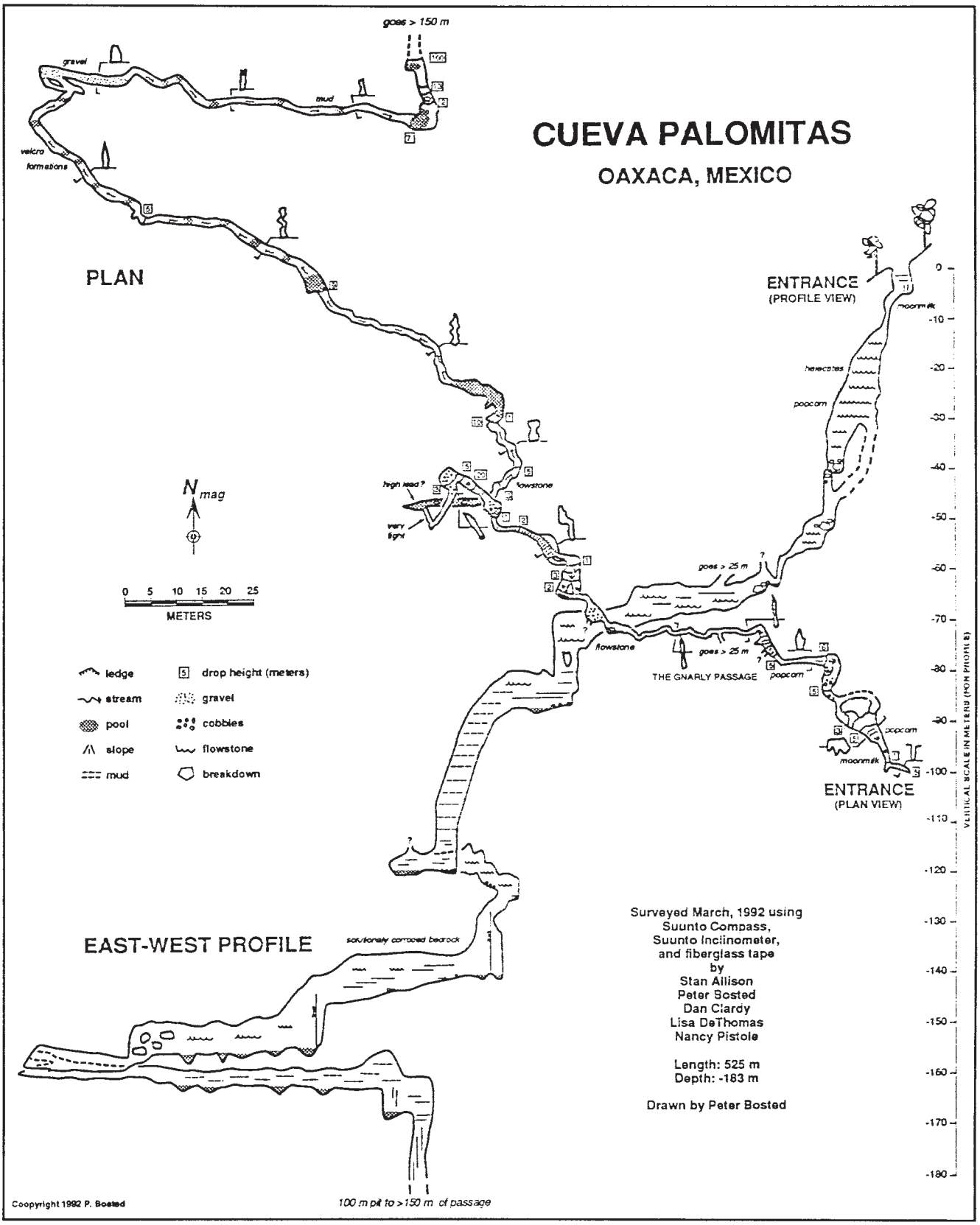
We drove to the end of the road, where the folks in the village of Peña Verde greeted us warmly. Cuicatecs, like the people near Cheve, they were aware of our work, as we have developed a very favorable reputation among the Cuicatecs. They seemed disturbed, however, to learn that our objective was the village of Zautla. "Hmm. They are Chinantecs," we were told. "They are different. You may find it difficult to deal with them." We worried about the potential problems, but resolved to continue and headed down the trail.

With topo maps, we had calculated that the round-trip hike was roughly equivalent to crossing the Grand Canyon. However, the trail proved to be the most illogical path we had ever seen, going up and down for no apparent reason. The map had not revealed its true character. Were we on the wrong trail? Passing locals reassured us that we were headed for Zautla. After about two hours, we arrived at the town of Tecomaltianguisco, also a Cuicatec village. The people were friendly and curious, and they allowed us to stay in the school for the night. As before, concern was expressed about our interest in Zautla. "They are very primitive. The women are not allowed out of their houses. They may not give you a place to sleep. They do not even speak good Spanish." The last warning fell on deaf ears. Our Spanish was not good enough to identify bad Spanish. As we left in the morning, the school teacher insisted on giving us a supply of tacos. "They will not allow you to buy food. You must take this food with you."

After about two more hours, we entered Zautla. The people we passed did not seem hostile, but each said the same thing, "Buenos días," followed by, "You must go see El Agente," the village leader. We decided to directly seek the agente, but we were told that he was in the corn fields. His secretary stored our packs and gave us permission to hike, but we were warned to stay away from pits and caves.

The Zautla area is much wetter than the Cheve area and easily recognizable as tropical. We hiked three kilometers north of town and climbed six hundred meters to visit a large doline that is prominent on the topographic map. We were not disappointed; it was spectacular. We were tempted to leave the trail and look for entrances, but our long-term goals prevailed, and we resisted the temptation to check pits and potential leads. Instead, we returned to town by the time we had promised.

For all the hype from the Cuicatecs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-170
-180
VERTICAL SCALE IN METERS (NON PHOTO 8)
EAST-WEST PROFILE
solutionally corroded bedrock
100 m pit to >150 m of passage
Surveyed March, 1992 using
Suunto Compass,
Suunto Inclinometer,
and fiberglass tape
by
Stan Allison
Peter Bosted
Dan Clardy
Lisa DeThomas
Nancy Pistole
Length: 525 m
Depth: -183 m
Drawn by Peter Bosted
Coopyright 1992 P. Bosted

about the primitive Chinantecs, we were amused to find a young Zautla man sporting bleached hair cut in a fashionable layered style. He had cut square holes in his jeans, and he wore a heavy-metal tee-shirt. Yet, like all of the residents of Zautla, he spoke Chinantec exclusively, except in conversation with us, when he spoke Spanish. Basketball is very popular in Zautla, and several men wore gym shorts and tennies during the late-afternoon games.

Heeding the warnings from our Cuicatec friends about Zautla's sexism, it was Bill who negotiated with the agente. He immediately liked our letters of permission. Yes, we could visit the caves in the morning. He would send the police force along to show us the caves. Was there a place where we could sleep? "Sure, here in the municipal building," was his answer. "I will provide guards." We speculated about whether the guards were to protect us from the locals or the locals from us. It was never made clear.

At 6:30 AM, the guards turned on the lights. A hint? We were soon up and going. About eight men, the "police force," led us about 350 meters down into a canyon. Our first cave was a resurgence entrance with a flow of about 3 or 4 cubic feet per second. They called it Ñiay Mahn. Wading in knee-deep water, we left the guides. Beyond the twilight zone, the passage was filled with bats in flight, and the cave sumped after about 100 meters. A little later, our guides took us to what appeared to be an upstream extension. Ultimately, they showed us four small caves and helped us explore three of them. We found the people of Zautla to be extremely friendly and generous. They shared their food, including a plant they were collecting and eating that resembled, or perhaps was, bamboo shoots. We returned to town for siesta. In the late afternoon, about fifteen men and boys showed us pits within the town. Several of the pits were clearly outhouses, and we declined to descend them. We hoped to visit the deep pits above town that they told us about, but there was not enough time. The agente and others made it clear to us in the evening that they would like us to stay one more day and visit the pits. It was tempting, but we had promised the folks back at Cheve that we would be home on the next day, and we feared that a rescue party might come if we were a day late. Our new friends told us that we will be welcomed again, and one man added, "God willing, you will return here next year." We were delighted as we loaded our packs and hit the trail.

Allison, Bosted, Hapka, Hose, Meyers, Miller, Oliphant, and Schenker entered Cueva Cheve on the twenty-fifth, traveling to Camp II, where we ate and slept for the evening. Our hike through this amazing cave continued the next day. After most caving trips, one vividly remembers the obstacles. Of Cheve, however, I vividly remember the only three places during the entire trip where the floor is smooth for more than five meters. Elsewhere, one is constantly clambering over breakdown, climbing rope, descending rope, traversing rope, chimneying, or passing some other kind of obstacle. Our travel was uneventful. After arriving in Camp III, most of us stumbled into bed, while the Swiss, Karlin, and Stan headed out to examine the terminal breakdown pile.

On the twenty-seventh, the Swiss left the cave, while most of us headed for the breakdown. Bosted and Hose chose to map a side loop and work on its leads. The others did some serious poking in the main part of the breakdown. There was no success, however, and all six cavers remaining in Camp III worked on the breakdown the next day. Several survey lines were run into the mess, in an effort to better define it. We squeezed, we hammered, we tried to coax the rock away. The wind teased across our faces, but no open passage was found.

The breakdown had proven frustrating, and it was time to do something else. There had been some spoken and written speculation about the geology at the end of the cave, but there was virtually no hard data. Hose was collecting data each day, but this work needed bedrock, not breakdown. It made a good excuse to visit Wet Dreams, the deepest passage in the explored system. Allison, Hose, and Miller headed for the terminal sump, while Meyers and Oliphant worked their way up Matt's high climb from the previous year. Wet Dreams is a visually and geologically spectacular passage, caving at its finest. After our visit to the sump, Stan and Tom headed back to camp, and Hose moved more slowly, collecting data. Matt's Lead had not gone, and our allotted time in Camp III had ended. We packed up and headed out on the thirtieth.

There turned out to be a second deep camp after all. Frazier, Haberland, and Pistole left for Camp II on March 6. Allison, Clardy, and Hose packed lighter duffs this time and headed into the cave on the seventh, joining the others in Camp II. The first group had been occupying their time by cleaning and improving the camp and checking leads in the Sumplands area above the 23 Meter Drop. They were ready and anxious to move on. Hose wanted to map the geology in the middle part of the cave, and Allison volunteered to stay and help.

All of us headed north through the Low-Rider Turnpike. At the start of the Swim Gym, Clardy, Frazier, Haberland, and Pistole continued toward Camp III, and Hose started "geologizing" on the way south. Allison unrelentingly checked leads. In one particularly interesting area, we split up for nearly an hour. When we reunited, Stan told me that the passage he had explored was a borehole and beautiful. We agreed to survey it. It trended parallel to the Low-Rider Turnpike and extended 206 meters along a fault. The floor was entirely breakdown, but much of it was covered by chocolate-colored flowstone with large, glittering crystal faces. We named the passage Hollywood Boulevard, for its glitter. Allison and Hose left the cave on the ninth.

Bosted and Clardy had discovered a cave close to the Cheve entrance, which they named Cueva de las Palomitas. Exploration of the new cave was continued this year by them, Allison, DeThomas, and Frazier. The cave was surveyed as exploration progressed, and total survey reached 540 meters. On the last trip, Allison and Clardy rigged a pit about 100 meters deep, descended it, and found going passage at the bottom. They were not prepared to survey the pit or to continue exploration, and hence they turned around with the passage still going.

Bosted, Coons, and DeThomas had left for the middle karst at the start of the second deep camp. Everyone is now hoping for another entrance into the system beyond the terminal breakdown and the Wet Dreams sump. The logical area to look for such a cave is near the town of San Miguel Santa Flor. The three found the local Cuicatecs to be friendly and supportive. One of the local men understood their desire for a cave with wind, and he took them to a place where a small stream sinks and steam rises from the ground on cold days. Coons was pessimistic, but Bosted and DeThomas dug right in. In a short time, they were in a cave with a strong breeze. The cave was tight, but the breeze drew them farther into the passage. After their reconnaissance trip, Bosted had to return to the States. Coons and DeThomas returned to the llano to recruit help.

Meanwhile, solitude in the llano was broken when Frazier arrived back at the llano from Camp III. Pistole was not far behind. They, too, had a successful trip to the bottom of the cave. Much of their attention was given to cleaning up Camp III, maintaining the latrine, and making an inventory of the equipment there. It was needed and appreciated work. They also salvaged some survey notes that had been inadvertently left by the earlier trip. More attempts were made in the frustrating breakdown pile, and, of course, a trip was made to the Wet Dreams sump. It was news from this trip that sparked a hope in everyone. Frazier estimates that he climbed about 100 meters up from one point in Wet Dreams. He reported walking passage at the top of the climb, but he did not pursue it, as he was alone. Besides, the lead will be an enticing carrot to bring cavers back to this important area of the cave.

Allison, Coons, DeThomas, and Oliphant returned the next day from their trip back to the middle karst. Cueva de Rancho Palomora had been pushed and mapped for 307 meters, where progress was stopped by a flowstone choke. It was a disappointing set-back.

The expedition wound down after Clardy and Haberland safely returned to the surface on the thirteenth. They had poked in the terminal breakdown during their extra day in Camp III, but with, again, no success.

We met our four stated goals for the project, despite unfortunate obstacles. We have a much better understanding of the geology of the system, finally having data to provide interpretations. We spent a great deal of time pushing leads in the terminal breakdown. Several new caves above the system were explored, and excellent relations were established with four new villages. There was even a brief public-relations visit to the village controlling the resurgence area, but Aragán and Oliphant were told "the presidente is not here." These successes are a tribute to the members of the expedition. They all contributed and kept their focus on our objectives. The expedition's success is also a tribute to Matt Oliphant and Nancy Pistole, who never wavered in their dedication to the project and to the expedition. When the usual, and unusual, problems confronted them, they always found a way to resolve the concerns. They are probably the only project members whose total commitment to this year's expedition was never in doubt from the meeting last July in Cobleskill though the middle of this March. Their steadfastness allowed the rest of us to anchor our plans.

The sponsors of this year's expedition were also key elements of our success. They were the Richmond Area Speleological Society, the National Speleological Society's International Exploration Fund, the Dogwood City Grotto, Pigeon Mountain Industries, and Bob and Bob.

Cueva Cheve is a remarkable cave and has to rank among the world's most outstanding. Its explored portions now extend 1386 meters deep and 22.5 kilometers long.

Exploraciones de la Sierra de Juárez, Oaxaca

La expedición del Proyecto Cheve, el cual se llamó Proyecto Pápalo, continuó la exploración de la Cueve Cheve y sus alededores. En el invierno de 1991 se intentó visitar una resurgencia, sin embargo el presidente municipal del poblado de Santa Ana Chiquihuitlán les detuvó. No obstante se conectó la Cueva Escondida con El Sistema Cheve haciendola así 1369 metros de profundidad y continuando así como la más profunda en las Américas.

En la primavera de 1991 se buceó un sifón que se escuentra a 1225 metros de profundidad y a una distancia de 8 kilometros desde la entrada, ganando 17 metros mas a la profundidad del sistema. También se hicieron intentos para pasar el derrumbe final sin buenos resultados. Tragicamente el espeleólogo Chris Yeager tuvo una caida fatal de 23 metros al desprenderse de su descensor tipo marimba. Posterior a esto no se hizo exploración alguna, exceptuando el estudio arqueológico de la entrada del cual se concluyó.

La expedición de la primavera de 1992 también falló al no encontrar pasaje alguno del derrumbe final, sin embargo se encontró otro pasaje prometedor. Se realizó una exploración meticulosa en la superficie sobre el área de el poblado de Zautla la cual se encuentra a trece kilómetros al este de Cheve. La Cueva de las Palomitas se topografió por 540 metros hasta a un tiro de 100 metros. También así la Cueva del Rancho de Palomora fue topografiada por una distancia de 307 metros.

Proyecto Montemayor, March 1992

Joe Ivy

Friday, March 13, 1992, saw most of the group leaving for Minas Viejas in Nuevo Leon, while Joe Ivy, Linda Palit, and Dan Hogenauer remained behind to continue preparations. Joe, Linda, and Dan left San Antonio Saturday morning. They crossed the border at the new bridge at Colombia and found the crossing quick and uneventful. Page Calloway, Catherine Berkeley, and Susan Herpin were to arrive Saturday night. Those already at Minas were Rob Bisset, Cathy Chauvin, Libby Overholt, Steve Young, and Peter Mills. Another group that came down from Austin and San Marcos, Texas, and arrived on Saturday included Karl Kieffer, Tim Stich, Mo Tangestani, Clarke Price, and Troy Freeman. Page, Catherine, and Susan arrived late Saturday night, camped at a lower camp than the rest of the group, and joined the others on Sunday.

Page had brought the "sump pump" supplies for the Rebirth Canal, a perennial sump at 440 meters depth in Pozo de Montemayor [see article in *AMCS Activities Newsletter* 18] that has foiled a number of attempts to reach the bottom of the cave in the past. When Page arrived, a sump-pump team, Tim Stich, Joe Ivy, and Peter Mills, departed for the Rebirth Canal at about noon. Montemayor had been rigged by a group of cavers from Monterrey, Nuevo Leon, the previous weekend, so rigging was not a problem. On the way down, however, Joe decided to do some rerigging. Once at the sump, Joe, Peter, and Tim began pumping the water out of the sump into a pool that was about 3.5 meters higher than the sump and about 10 meters upstream, using a bilge pump and a length of 4-centimeter-diameter hose. After only fifty minutes, the sump was emptied completely. The trio left the cave at 4:00 AM.

The next day, Monday the sixteenth, Peter Mills led a group into Montemayor to begin photographing the upper section of the cave. They did not enter the cave until evening.

On Tuesday, Joe, Linda, Rob, Catherine, and Dan prepared to enter Montemayor to camp just before the Rebirth Canal. The group entered the cave beginning at about noon. Joe did some more rerigging as he went down, and Rob set a Petzl Long-life stainless-steel bolt at the top of the Muddy Whore drop to augment the existing bolts. The camp was established, and the group turned in for the night. It is worth noting that none of the camp-crew members had ever participated in an underground camp before.

The same day, Mo formed a survey crew with Page and Cathy and began a resurvey at the top of the Big Pit, the 115-meter drop that is part of the "historic section" of the cave. Also, later that day, Peter, Susan, and John entered to take more photos. All of these folks eventually found their way down to the camp at -440 meters. Mo's survey crew decided to sleep for a few hours before leaving, and Peter's group headed right out.

On Wednesday, the camp crew got organized and headed into the Canyon Passage, beyond the Rebirth Canal, intending to bottom the cave and do a bolt climb and some resurvey in the Bottom Borehole. Mo's survey crew decided to tag along, since none of them had seen the bottom of the cave. Unfortunately, the camp crew was unable to locate the next two drops, which lead to the Bottom Borehole. Instead, a substantial amount of time was spent looking about. Page found a virgin upper-level passage that led to a pit, and Rob located a lower-level pit that clearly captures the water coming through the Canyon Passage. Rob and Joe checked the pit, with Joe acting as the rig point and Rob dropping the pit. The pit was tight in places and ended at a pool and a very tiny pinch that the water flows through. The pit was about 8 meters deep. The rest of the group were still looking around. After the group reassembled, at the top of Page's Pit, Joe placed two bolts at the top of this drop, as there were no natural rig points. Page descended the pit on a 27-meter rope. The rope just reached a ledge, where Page was able to get off rope, and Rob joined him there. Page could see that the pit continued down for another 30 meters to a mud-floored borehole, probably the Bottom Borehole, which would make the pit an alternate route to the bottom of the cave. This will aid in future exploration, because this alternate route is much quicker and easier than the other known route.

At this point, the crew broke up somewhat, and Joe, Rob, Linda, and Cathy remained behind to recharge carbide and eat. Rob wandered off into an adjacent dome, started climbing up through breakdown, and found that the dome went a considerable way. He returned and told the others of his find, and Joe, Linda, and Cathy decided to see it, since Rob reported that there were some nice formations. Rob stayed to rest, and the three climbed up into the dome. They missed Rob's route and instead climbed even further up on the breakdown to discover a very large virgin room. The room was about 100 meters long by 20 meters wide and had a ceiling height of 25 meters. The room was well decorated and had fairly fresh bat guano on the floor in one area. This led to its being named the Bat Hall. The bat roost indicates that there is a lower entrance to the cave somewhere that is at least bat size. After Rob had been shown the room, all four of them rejoined the rest of the crew, and everyone headed back to camp. That evening, Page, Mo, Cathy, and Catherine left the cave.

On Thursday, Rob, Joe, and Linda returned to the Canyon, and Dan stayed in camp. The objective was to derig Page's Pit and reach the bottom by the old route. If there was enough time, the bolt climb would be attempted. They found Page's Pit without incident, since the route had been flagged the previous day, and the pit was derigged. They then descended in the Canyon and managed to locate the drops into the bottom of the cave. Rob

and Joe descended the 20-meter drop, while Linda remained at the top and waited. Joe headed for the last drop and rappelled the 40 meters. Rob also descended, and he remained at the bottom of the pit to rest and eat, while Joe continued to the downstream end of the Bottom Borehole. This passage had been found to end in a sump, and one of the objectives of the trip was to determine if the sump was permanent. Joe found the sump and saw that the underwater passage leading off the final room was about 1.5 meters wide and 1 meter high and sloped downward at about a 30-degree angle for at least 1.8 meters. The sump is definitely permanent, and a dive with tanks will be required to explore it. Joe rejoined Rob, and they headed out, derigging the two bottom drops as they did. Linda, Joe, and Rob returned to camp.

Friday, Dan, Joe, Rob, and Linda packed up their gear and headed for the surface. The 49-meter Disbeliever's Pit was negotiated, and the group marched on to the 106-meter Argo Well. Rob, Joe, and Dan ascended without their packs, and Linda stayed on bottom to put the packs on the rope to be hauled up. Happily, three Monterrey cavers on their way into the cave were encountered at the top of the pit, and they assisted in hauling the duffels up the Argo Well. The camp crew continued on down the 10-meter Muddy Whore and reached the bottom of the 113-meter Big Pit. Here, a buffoon sump occurred, as there were more Monterrey cavers heading in. The Mexican cavers helped for a while, and one duff was hauled up, but due to the fact that there was a rebelay on the pit, which is not a free drop, the hauling idea was temporarily abandoned. The Mexicans continued on into the cave, and the camp crew regrouped at the top of the Big Pit. It was decided that Rob and Dan would leave the cave and Linda and Joe would camp in the cave one more night. Rob was to return the next day with reinforcements to help get the duffs out of the cave. After Rob and Dan left, Joe rappelled back down the Big Pit and decided to carry his duff to the top of the drop instead of spending the night at the bottom.

The next morning, Saturday, Rob returned with Cathy, Steve, Peter, and Page. Linda descended the Big Pit and put the remaining duffs on the rope, and the rest of the group hauled them to the top. Once the duffs were up, their contents were divided among those present, and each person headed out with a load. Everyone was out of the cave by about 4 PM. Page, Catherine, and Susan left for Texas that afternoon, and the rest of the group left the following day.

During the week, numerous day trips went into Montemayor for photography. Peter Mills led the photo trips and managed to photograph everything from the entrance to the Rebirth Canal.

All in all, this trip was successful, even though the original objectives remain largely undone. While the bolt climb in the Bottom Borehole was not done, new passage was discovered and new routes were found. Also, several people had their first cave-camping experience, and this alone is of great value for future trips. It is obvious that the canyon beyond the Rebirth Canal will require extensive checking and a very careful resurvey. This will require a camp trip to be successful. The Rebirth Canal is no longer a significant obstacle now that the pump is permanently in place, and the time required to empty it is not prohibitive. The primary objective will remain the same for the next trip to Montemayor: to push the bolt climb in the hope of finding a lower entrance to the cave. Also, diving the terminal sump is now a new objective, but that can wait until a new entrance is found, since hauling tanks down to the sump would be a remarkably strenuous task.

Proyecto Montemayor, Marzo 1992

Espeleólogos de Texas establecieron un campamento subterraneo en el Pozo de Montemayor, en el estado de Nuevo León. Anteriormente la cueva fue armada por espeleólogos de Monterrey. Se bombeó fácilmente el agua del Canal "Rebirth" el cual esta usualmente sifoneado, y el cual es un obstáculo para así visitar el final de la caverna. Pasages adicionales fueron encontrados mas allá del sifón.

Cathy Chauvin lights the formation wall in the passage at -106 meters, 30 meters before Argo Well. *Joe Ivy.*

THE EXPLORATION OF SÓTANO DE LUTEVIO

Alan Cressler

Sótano de Lutevio was discovered by Gerald Moni and Jack Thomison while on a cave-hunting trip in the area of Xilitla, San Luis Potosí, around Easter 1991 (see also Mexico News). The cave is located northwest of Puerto de Amayo, on the Ahuacatlán 1:50,000 topographic map. On March 5, Gerald and Jack were led to the cave by a local guide. They descended the 58-meter entrance drop. At the bottom of the drop, a narrow canyon continued to the top of a second pit with a very tight entrance. They noted strong air flow and planned to return on a future trip.

The return push began on November 25, 1991. Jeff Dilcher, Andrew Porter, B Stickney, Neeld Messler, Gary Burwasser, Shari Lydy, Marion Smith, Bethany Jablonsky, and Alan Cressler entered the cave. The entrance drop was bolted near the top for a rebelay, and there was a second rebelay to a formation near the bottom. The canyon at the bottom of the pit contained two 1.2-meter climbs down to a tight spot. A small canyon sloping downward led to a 3-meter climb down to the top of a 6-meter pit. This was where Jack and Gerald were stopped on the original trip. The top of the pit was very tight and had to be hammered open. There was a good rig point above the drop. A larger canyon passage continued from the bottom of the drop to another 3-meter climb, this one down into a larger room. From there, a 1.2-meter climb led up into a narrow canyon, which led to a 1.2-meter climb back down to a short crawl and a room large enough to sit up in. A small canyon, another 1.2-meter climb down, and more narrow canyon led to a standing room. From there, a tight rift 8 meters long was followed to the top of a 17-meter pit, which was rigged to one bolt and a natural projection as a backup.

The 17-meter pit drops into a large room, from which a downward-sloping passage, lowering to a hands-and-knees crawl to a 1-meter drop, led to two pits, 6 and 5 meters, separated by a short slope. We were able to rig both drops with one rope tied to a large flake and rebelayed to a natural projection above the lower drop. There was a room at the bottom, and a high, fossil canyon continued down-slope over two 3-meter-deep holes in the floor to a 1.8-meter climb down into a dusty passage that continued the downward slope of the cave. A 2.1-meter climb

Group photo, November 1991 trip to the Xilitla area. Standing, left to right: B Daniel Stickney (Nashville, Tennessee; back to camera), Jeff Dilcher (Atlanta, Geogia), Neeld Messler (Denver, Colorado), Kris Green (Atlanta, Georgia), Viko Jones (San Luis Potosí, SLP, Mexico), Teresa Williams (San Luis Potosí, SLP, Mexico), Randy Heath (College Park Georgia), Gerald Moni (Antioch, Tennessee), Gary Burwasser (Tallahassee, Florida), Andrew Porter (Knoxville, Tennessee). Seated: Alan Cressler (Atlanta, Georgia), Marion O. Smith (Knoxville, Tennessee), Bethany Jablonsky (Denver, Colorado), Roger Haley (Huntsville, Alabama), Shari Lydy (Birmingham, Alabama), Pat Smith (Huntsville, Alabama). John Stembel (Atlanta, Georgia) not in picture. *Alan Cressler.*

dropped into a larger canyon, which unfortunately turned into an 8-meter tight crawl to the top of an awkward 4-meter pit. The rig-point for this drop was marginal. At its bottom, a 2.5-meter climb up led to a small canyon that went to a sloping pit 15 meters deep. There were natural rig points for this, and one good redirection. This pit dropped into a large room with several leads. The higher leads were checked and didn't go. A small stream continued through the drain in the bottom of the room. A low crawl, sloping to one side, continued 5 meters to a 3-meter climb down into a steeply sloping, large passage, which led, via two more 3-meter climbs, to the top of a wet 20-meter pit. We were out of rope at this point, just as the cave was really beginning to open up. On this trip, cavers were in the cave from six to ten hours.

The next day, the twenty-sixth, Porter, Stickney, Burwasser, Smith, Cressler, John Stembel, and Kris Green entered the cave with as much rope as they could carry. The wet 20-meter pit was rigged to one bolt, with a natural backup. At the bottom, a narrow canyon sloped down 8 meters to the top of an 18-meter pit. Rigged from one bolt, it led to a 6-meter-wide ledge to a 25-meter pit. This pit was also rigged from a bolt, and the wet drop led into a large room. From there, the usual sloping canyon and rift, with a 3-meter climb-down, continued to an 8-meter pit with a natural rig point. The passage continued past a dome area and under a large piece of breakdown, down 2- and 3-meter climbs with a small hole connecting them, and down a 3-meter pit with a natural rig point.

From there, the canyon was walking height, but it got lower before the top of a 14-meter pit, the Dirt Drop, was reached. One bolt was placed, and there was a natural backup. At the bottom of this drop, we rigged a 3-meter pit using a large rock that divided it into two sides. A short canyon and a 10-meter pit rigged from a formation took us into a room with a flowing stream. Around the corner was a 7-meter pit, again rigged from a formation. At the top of this pit, John Stembel had a chert ledge break away, dropping him into the pit. Fortunately, he was attached to the rope with his safety ascender. This pit was quickly followed by a 24-meter pit, which was quite wet. There was a good natural rig point, and a good rebelay point on a major ledge 18 meters down. This pit led immediately to another wet pit, this one 9 meters deep, with a natural rig point.

At the bottom of that drop, the nature of the cave changed. The passage became a narrow, but walking stream canyon with numerous down-climbs and one upright squeeze. Eventually, a 2.5-meter climb takes one down to the edge of a 12-meter pit that has a natural rig point and a place for a hanging rebelay near the lip. This pit was very wet, and it dropped into a large room with a 3-meter climb down to the top of a 5-meter pit. There was a large, wedged boulder at the top, and a natural anchor. More walking canyon sloped downward to a sharp V-shaped bend and numerous short climbs. Next were two 4-meter pits, each with natural rig points. A narrow canyon continued downward, leading to a 3-meter climb down to a sump pool 1.2 meters deep. The lower canyon had no air flow, and we are not sure where we lost it. On this trip, the cave was derigged to the 25-meter pit. Trip times ranged from sixteen to twenty-one hours.

The rest of the cave was derigged the following day by Burwasser, Lydy, Messler, Roger Haley, Pat Smith, Teresa Williams, and Viko Jones, during an eight-hour trip. Although the cave was not mapped, all pits and climbs were taped, and Alan Cressler kept detailed notes as the cave was explored. We estimate the depth at 460 meters and the length at 600 meters.

Sótano de Lutevio can be best described as a "horror hole." Exploration was difficult, but the majority of the explorers were already accustomed to caves like it in their home areas. The depth potential is estimated to be about 800 meters, and a careful search for the source of the air-flow might lead to passage that bypasses the sump. The cave is open for anyone to explore.

Sótano de Lutevio, Xilitla

Esta cueva fue explorada en 1991 hasta una profundidad estimada de 460 metros. La entrada es vertical con un tiro de 58 metros. Posteriormente la cueva esta formada por cañones angostos y tiros cortos, y la cual se acaba en un sifón. En la parte superior de la cueva existe bastante corriente de aire. Debido a la cantidad de agua y estrechéz de la caverna espeleólogos del sureste de EEUU le llaman el hoyo infernal.

SPELEONAUTIC 88
CAVE DIVING IN MEXICO

Oliver Knab

Mexico was one of the most important goals of our cave-diving trip around the world. My main interest was to locate the springs along our route between Chihuahua and Mérida. We did over twenty-five hundred kilometers on land, by bus and train, which was by far the most strenuous leg of our trip.

Our point of departure was Los Angeles, California. We reached Chihuahua via Tijuana and Hermosillo. There, we caught the famous Pacífico train, first to Creel, in the vicinity of Copper Canyon, scenery worth seeing and populated by the stubborn Tarahumara Indians, some of whom still live as cave dwellers. Near Creel we found such a cave dwelling, Cueva de Sebastian. The 20-by-20-meter cave room contains a kitchen, a sleeping place, a storeroom, and a goat pen. The Cuevas de San Ignacio are no longer used as dwellings. They are 10 kilometers southeast of Creel. One is 5 meters long and 8 meters wide, and the other is 5 meters long and 12 meters wide. The greatest sights in the area are the granite towers up to 60 meters high in the Valley of the Monks.

After a successful trip back to the city of Chihuahua, we inspected our first spring pool, near Jiménez, Chihuahua, a 31.4-meter-wide, 51.76-meter-long spring basin in a desert landscape with measured visibility of 45 meters and a temperature of 34 degrees C. Two small spring holes, a maximum of 2.45 meters deep, with sandboils are the main water feeders. Bold little fish nibble on one's feet and legs, which can really be a pain when one is surveying. This spring, the Ojo de Dolores, flows at 165 liters per second.

In the vicinity of Valle de Allende, we located the Ojo de Talamantes. A spring situated on a mild rise feeds a dammed-up basin that is used as a swimming pool in this remote valley. Turtles were evident. Another beautiful canyon with pools of water can be visited nearby.

A real surprise was the Cueva del Diablo near Salaices, Chihuahua. The collapsed funnel is located in a conglomerate stratum. After we crossed this zone, we saw fantastic solution-etched passages decorated with large formations. No fewer than ten open leads were found in a stretch of 209 meters. A deep shaft was passed halfway through. Passage cross-sections of 5 by 10 meters suggest that a larger system exists below.

The Cueva de Remedios is a very special cave. Off all trails in a valley typical of the Sierra Madre, this 19.28-meter-long water cave contains a waterfall decorated with aragonite crystals that delivers water with an estimated temperature of 37 degrees C.

One of the strangest railroad trips in Mexico runs between Escalón and Cuatrociénegas, Coahuila, across the desert-like Sierra Madre Oriental. The train runs so unusually slowly that one has to spend the night in no-man's-land, El Oro. Near Cuatrociénegas is the Poza de la Becerra, a fantastic spring with crystal-clear, bright blue water. Three spring pools have a maximum depth of 4 meters, 30 meters visibility, and 32° to 34° C temperatures.

El Churince is a spring pool 20 meters in diameter and 2 meters deep, with 10-meter visibility.

The Laguna de la Mina is a similar shallow spring pool with a large surface area, but a depth of only 1 to 1.5 meters; visibility is 15 meters. A spectacular view of the Laguna de la Mina is gotten from Mina del Capia, a 12-meter-long tube in limestone. These are located 16 kilometers south of Cuatrociénegas, Coahuila, near a chapel left of the road.

Manantial de Hermanas is another thermal spring in Coahuila. The temperature is about that of a hot, but just bearable bath, 45° to 50° C.

The Ojo de Agua de Lampazos, Nuevo León, was flop number one on the trip across Mexico, a miserable black-water puddle. Maybe one should visit it during high water, because it's supposed to clear up.

Bustamante in Nuevo León is familiar to AMCS cavers for huge caves with giant formations, such as the Gruta del Palmito. Because the author does not experience positive mood changes when looking at such inconsequentialities, though, he attempted to occupy himself aquatically here, as well. The Manantial de San Lorenzo is part of a karst water system, but is unimportant because it has no flow. The Cueva del Cañon near Bustamante was mapped; it is 18.69 meters long.

Near Sabinas Hidalgo, Nuevo León, three caves, Cuevas de Sabinas Hidalgo I-III, were seen from the bus in the canyon towards Villaldama. The Ojo de Agua de Sabinas Hidalgo is a large karst-water resurgence through cobbles; this spring feeds water to a swimming pool.

Near Monterrey, an absolutely catastrophic industrial city, there is the Grutas de García. Giant and well decorated, this cave probably makes tourist hearts happy. (Formations are boring, not edible, and present in too many caves.)

The Nacimiento del Río Mante, Tamaulipas, has considerably better characteristics. This is, at present, the third-deepest underwater cave in the world. Sheck Exley reached 242 meters deep in 1988. [See *AMCS Activities Newsletter* 17. Exley reached -267 meters there in 1989.] This is considered the world record for cave diving. On 24 April 1988, the water temperature was 26.9° C, and the underwater visibility was 35 meters.

In Nacimiento de Riachuelo, Tamaulipas, we saw a water snake. The spring pool had minimal flow, only a few liters per minute, and was heavily clouded by algae, with 2-meter visibility.

The Nacimiento del Río Sabinas was one of the prettiest places we saw on our Mexico trip. Northwest of El Encino, Tamaulipas, lies one of the prettiest vauclusian springs in Central America. The emerald-colored spring basin, 15 by 30 meters, can only be reached via a dry river bed. The spring was explored in

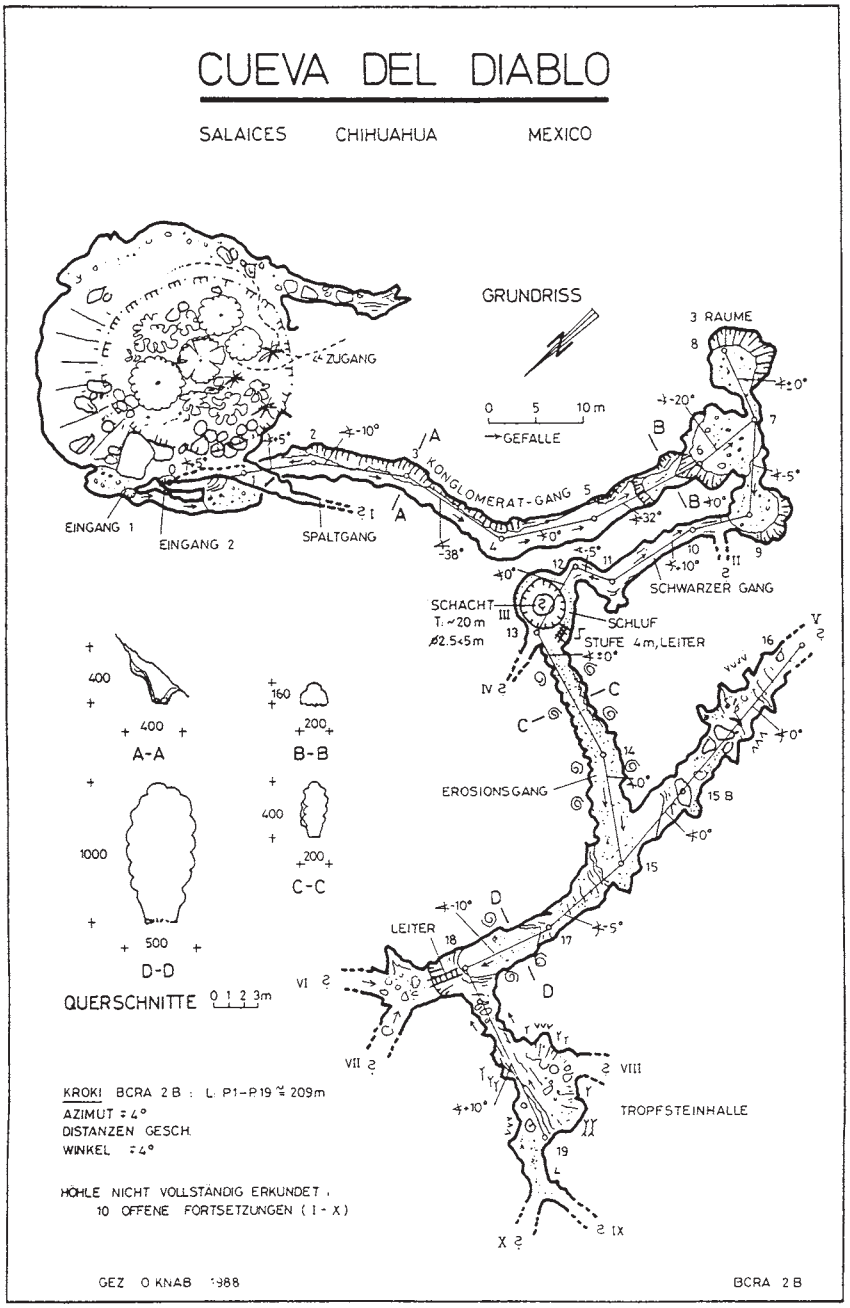
In 1988, Oliver Knab made a round-the-world cave-diving junket, and Mexico was a major part of the trip. These notes on sites visited in Mexico are part of a longer article originally published as volume 26 (number 78) of *Höhlenpost*, newsletter of the Ostschweizerischen Gesellschaft für Höhlenforschung section of the Société Suisse de Spéléologie. Translated from German by Katie Arens.

March 1979 by an American team down to a depth of 95 meters. Temperature was 19° C, visibility 25 meters, underwater passage 175 meters, with a constriction at -55 meters and a second, undived constriction at about -97 meters.

One should not fail to visit the Nacimiento del Río Choy, San Luis Potosí, a magnificent resurgence, by which an old train line runs. An underwater cave connects to the gigantic cavern; it was dived to 40 meters depth and 379 meters length in 1979 by a team of U.S. divers, Terry More, Dan Lenihan, Frank Fogarty, Paul DeLoach, Ken Fulghum, Dale Sweet, Steve Forman, Bill Stone, Carol Vilece, and Sheck Exley. [They also visited a number of other springs. An article by Sheck Exley appears in *AMCS Activities Newsletter* 10.] The Cueva del Puente lies on the train line that leads north out of Ciudad Valles past the Río Choy. It is a small cave, only 3 meters.

On 24 April 1988, I visited the Sótano de las Golondrinas. By bus, you reach Aquismón, where you get all the permits you need to visit this gigantic pit. The drive up is achieved via El Limoncito and the mountain village of Tamapatz. This trip is quite an adventure with an ATV.

Candido, my guide, pointed the way through the steaming jungle. Soon we reached the famous corn field: only three hundred meters to the famous shaft. A little house stands right in front of the 50-by-50-meter opening, and we could already hear the green parrots that circle in the upper part of the sótano. Thirty meters farther, and we stood at the brink of the pit, 330 meters of free fall in front of our feet. A third of a kilometer down, I saw the oval green-black bottom of the pit clearly. Sótano de las Golondrinas was visited for the first time by cavers in 1967. In 1969, a narrower continuation of the pit was found, leading to -512 meters. Golondrinas is no longer the longest vertical drop in the world. In 1972, they found the Sótano del Barro, which, at 410 meters absolute vertical, took over first place.



We found two small caves near Tamapatz. The Sótano del Prado is a pit on the way to Golondrinas. At -3 meters the pit is no longer free-climbable, and at -8 meters you can see a small drop, with the cave continuing to the north. The Cueva del Vaso lies on the road leading northwest out of Tamapatz. A gully-like entrance leads vertically into a chamber 3 by 4 meters in area, with a side crevice to a depth of 6 meters.

A few days later, we arrived in Río Verde, San Luis Potosí, and located the Manantial de la Media Luna. In the restaurant La Cabaña in Río Verde, you can rent diving gear and diverse special supplies. In a total of 3 hours and 28 minutes of diving time, I investigated this 30.2° C warm vauclusian spring. At -35 meters lies the key place in the cave, an underwater vent with a current strong enough to rip off one's helmet. Not only is the current massive, but a wedged tree is an extra obstacle for the diving caver. Equipped with three compressed-air tanks, I drew myself down in the sharp-angled opening and was almost prematurely spit out again by the torrent of water. You have to climb down to -46 meters; if your hands let go of their rocky handholds, you'll get an undesired lift. At -48 meters, you can't go any further. The passage profile shrinks to 1.5 by 0.8 meters, and the speed of the current doubles. Turn around, and you are catapulted toward the vent at 2 meters per second. Woe to you if you get hung up; the wedged tree at -35 meters is waiting for victims. In the large spring pool of Media Luna, there are six more spring openings, which were all dived (see the map). The visibility varies between 10 and 40 meters, depending on which crater or cave one is in.

Los Anteojitos is another spring south-

east of Río Verde. In the smaller of the two spring pools, I reached -9 meters. That is the deepest point, where there are sand boils. Visibility was 15 meters.

Near Jalpan, Querétaro, another speleomecca in central Mexico, I visited the Sumidero del Río Escanelilla. An entrance 25 by 12 meters leads into an enormous ponor, or stream sink, with passages up to 30 meters high and 10 meters wide. To the right at the first branching, there is a sneaky CO_2 well that makes your respiration rate climb drastically and suddenly—about face! The main passage gets bigger and bigger, and it has some formations. Back in the village above the cave, I learned that one can do a through trip; about 2 kilometers toward the valley is the resurgence, which we then also visited to a distance of 350 meters.

Our next stop was Cacahuamilpa in Guerrero. We spent 38 hours in the super river caves of Río Subterráneo de San Jerónimo and Río Subterráneo de Chontalcuatlán. Our camp was in the giant entrance of San Jerónimo. A trip into Chontalcuatlán is more varied than the trip into San Jerónimo, with deeper pools of water and short climbs, giant travertine pools, and clearer river water. I went into both caves alone for about a thousand meters. Maps of these caves are found in the *Canadian Caver*, volume 8, number 1, 1976.

Naturally, we visited the interesting town of Taxco, center of Mexico's silver mining. Silver jewelry and precious stones are to be found in many stores. The bus trip continued to Cuautla, Morelos. There, we briefly visited the Manantial las Tazas.

In Oaxtepec, Morelos, the Pozo Azul was measured: depth 4.98 meters, temperature 18.5 degrees C, visibility 15 meters, flow 72.75 liters per second on 7 May 1988. This spring is located in volcanic rock.

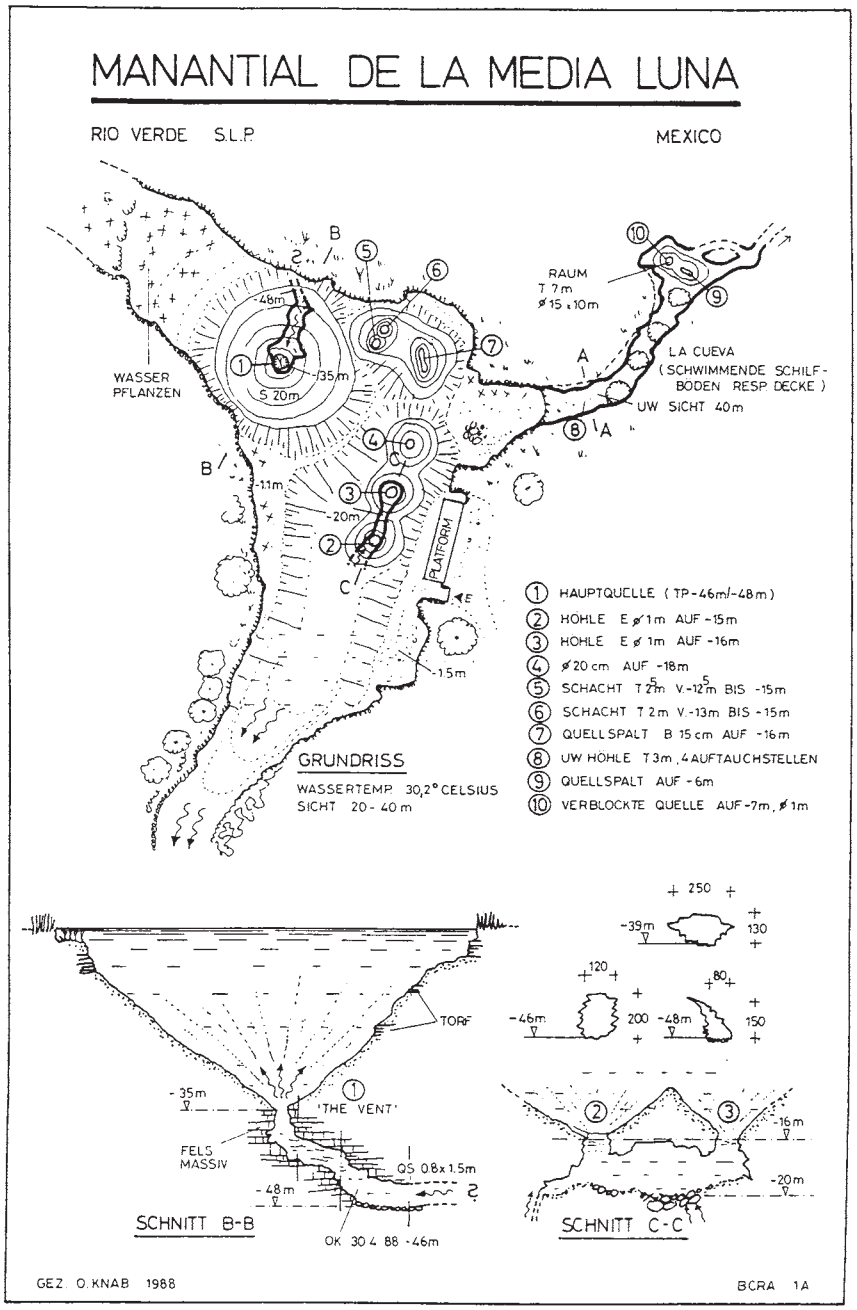
Through cactus deserts and valleys, our trip proceeded several hundred kilometers to Puerto Escondido, Oaxaca. In Santiago de Juxtlahuaca, we were able to inspect a large spring with little flow. Manantial Laguna de Juxtlahuaca has a maximum depth of 9.73 meters, has a surface temperature of 20° C, and delivers 25.9 liters per second; visibility is 4 meters in the bright blue, lime-saturated water. In Puerto Angel, we explored a draw well, Pozo de Agua de Puerto Angel, approximately 15 meters deep.

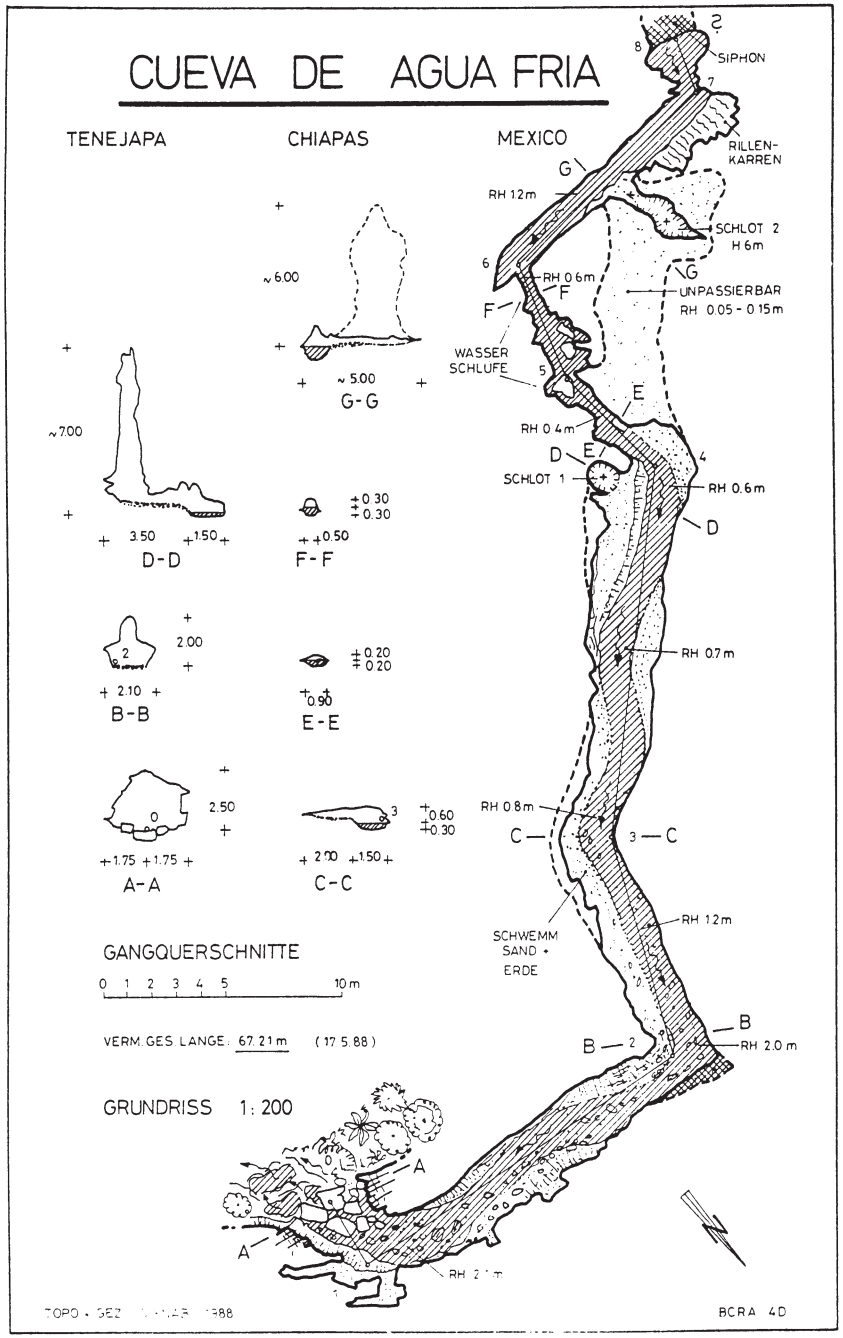
Near Tuxtla Gutiérrez, Chiapas, you can travel down the Cañon El Sumidero with a boat. On this tour, you can visit the Cueva de Silencio and the Cueva de Colores. Both caves can be traversed with boats. Silencio is a room 20 meters across and 10 meters high. Colores is impressive because of its reddish-pink precipitates. There are alligators in the Cañon El Sumidero.

El Chorreadero probably needs no introduction. This high-class water cave is probably the most spectacular in Central America, with a length of 3300 meters, waterfalls, and long stretches of swimming. During my visit, I found an aggressive and rather large fresh-water crab in the last lake; it tried to ward off my arrival at its shore with threatening claws.

The Sumidero del Río Amarillo drains the whole valley of San Cristóbal de las Casas, Chiapas. About 100 meters from the pond-like ponors, a tunnel was dug through to the other side of the mountain to prevent future flooding of San Cristóbal. Whoever has a chance to visit San Cristóbal must absolutely visit the NaBOLOM Museum. A fantastic library on Mexico and Guatemala also contains interesting caver magazines, such as the *Canadian Caver*. A comprehensive ethnographic collection of archaeological artifacts of the Lacandons of Chiapas is open to the public.

Using special maps, I found a really




CUEVA DE AGUA FRIA
TENEJAPA
CHIAPAS
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SIPHON
RILLEN-KARREN
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UNPASSIERBAR RH 0.05 - 0.15m
WASSER SCHLUFE
RH 0.4m
SCHLOT 1
RH 0.6m
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RH 0.8m
RH 1.2m
SCHWEMM SAND + ERDE
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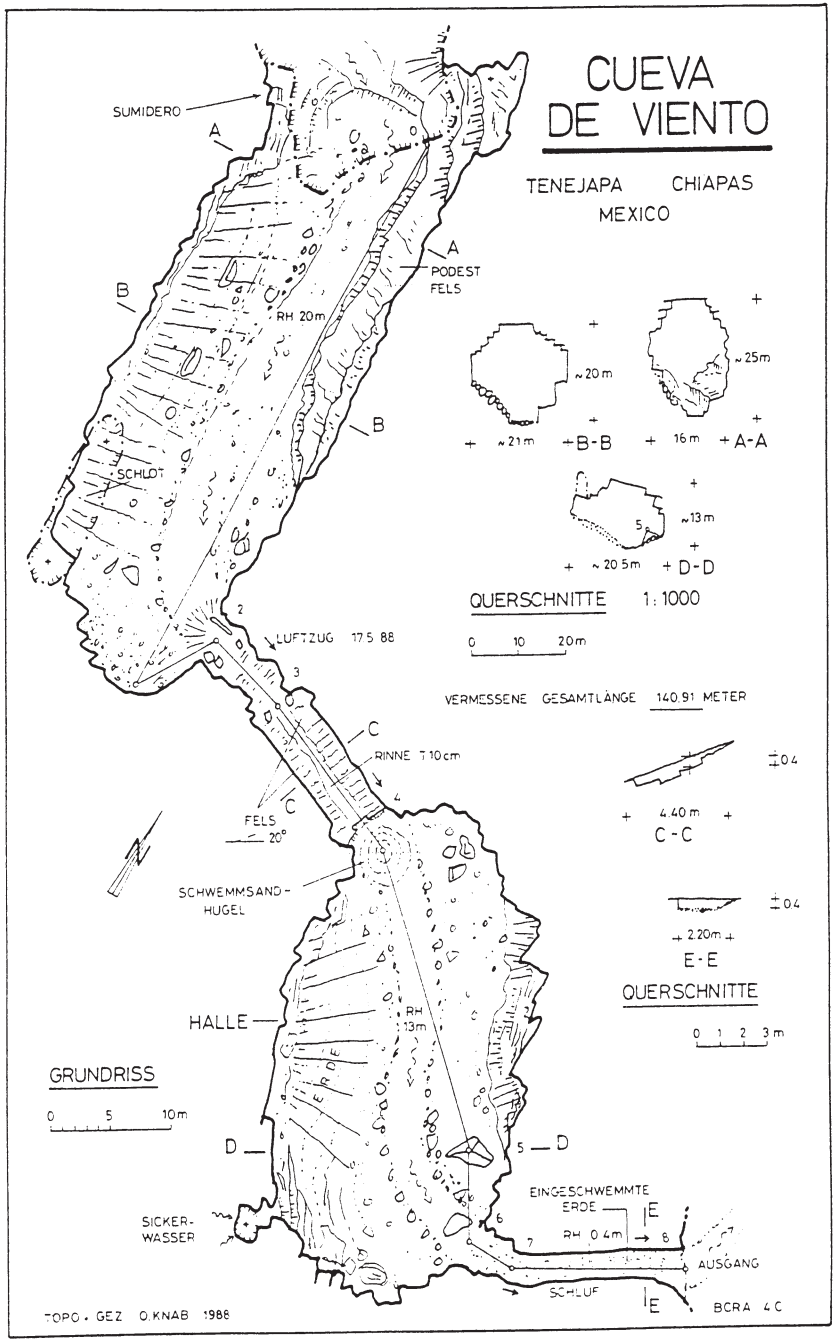
CUEVA DE VIENTO
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TOPO: GEZ O.KNAB 1988
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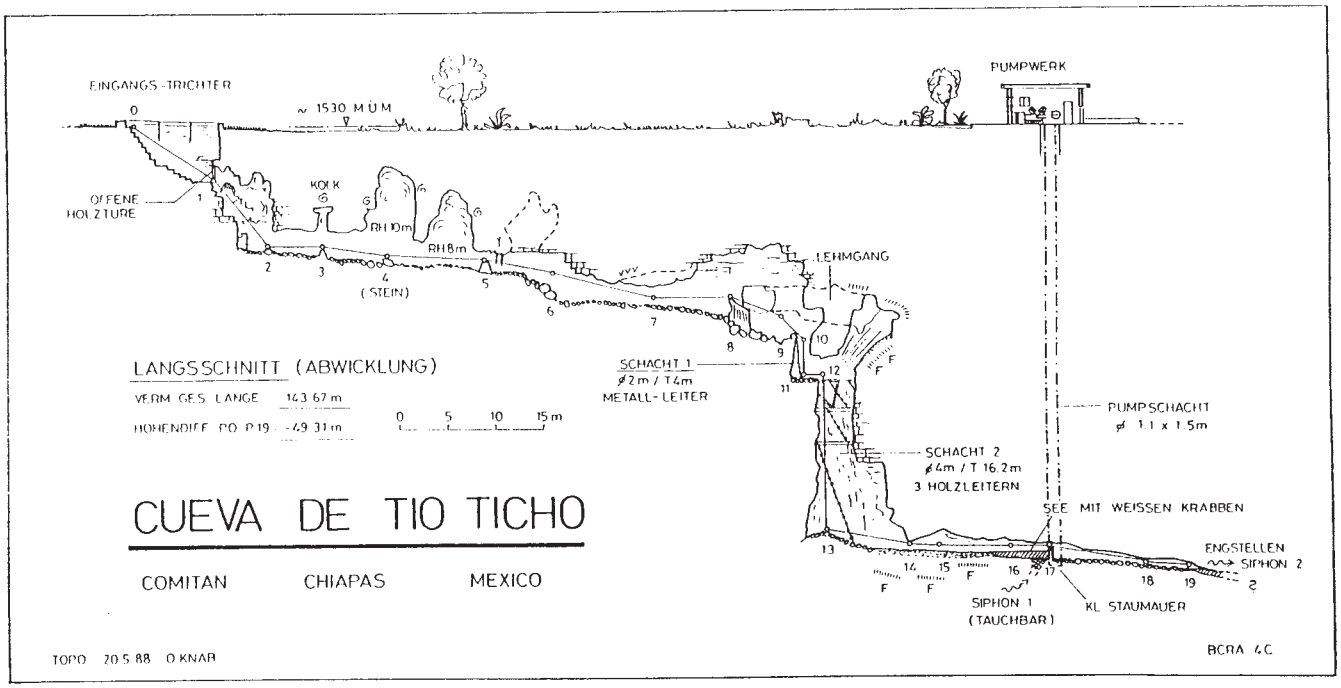


interesting spot into which a stream was supposed to vanish. We took a *colectivo* to Tenejapa, where a real speleo-paradise awaited us. We followed the village stream north and came to a giant green hole into which the water disappeared, cascading down in steps. We clambered down over steep slopes with fairy-tale vegetation and discovered four different caves within two hours. The main stream vanishes into the Sumidero de Tenejapa, an oval shaft 12 meters deep, which joins with a passage of huge dimension with further pits with flowing water. Here, we're about 2050 meters above sea level, and the depth potential may be massive. [In 1972, Canadian cavers mapped this cave to a sump at -209 meters. See *Canadian Caver*, vol. 5 no. 1, 1973.]

Across from the Sumidero, I measured a resurgence, the Cueva de Agua Fría, a stream cave with diverse water constrictions and an undived sump. We surveyed 67.21 meters. A second water source is located directly above the sumidero pit. Climbing up a mossy, dry stream bed in the green hole, I reached an 8-meter-high stone step that I managed to free-climb while an ice-cold wind blew around my ears. Five meters further on, an ultra-narrow elliptical opening was in sight. I christened the newly found place Cueva de Viento and pushed myself into the mountain through the 0.4-meter-high passage. After just a few meters, I was standing in a hall 25 by 35 meters and 20 meters high. The Cueva del Viento was mapped to 140.91 meters long; daylight enters through another sumidero in a valley that was dry at the time. Chiapas is really something, and it will probably yield some spectacular meters of cave in the coming years. The most impressive cave in the state is, though, Sumidero Yochib, which has been followed 3300 meters to 206 meters depth. This ponor takes a river, and it truly challenges its visitors with tyrolian traverses, rushing sluices, and shafts.

The Gruta de San Cristóbal is a show cave worth seeing. After approximately 500 meters of show cave, one takes out his equipment, which was smuggled in as inconspicuously as possible, and disappears into a 15-meter-high canyon passage that descends almost endlessly farther into the mountain. After about 2.6 kilometers, one reaches the Kramsky Salon and other giant formation rooms. The Italians reached -505 meters in 1987.

In San Cristóbal I got a tip from an anthropologist: there was a cave in the vicinity of Comitán, Chiapas, with the curious name of Cueva de Tío Ticho, Uncle Ticho's Cave. A taxi driver from Comitán let us off at a water-pumping station at the edge of town, and not far away we found a steeply sloping funnel leading down into the cave. This interesting stream sink with zones of drops and two sumps was completely surveyed for 143.67 meters. The left sump was investigated without equipment for about 4 meters; a triangular underwater passage 0.6 by 1.3 meters goes on.

Near the Guatemalan border lies the Montebello National Park, with its various colored karst lakes. By boat, we investigated a Mayan island in Lago Tziscao. Nearby, we found a very interesting cave, which I surveyed completely in the following three days. The Gruta Paso del Soldado is, at 695.69 meters, the longest cave mapped on my trip. It is 50 kilometers west-southwest of Comitán, near Laguna Bosque Azul. At 58 driving kilometers from Comitán, the pavement ends. The cave is about one kilometer north of the parking lot. A small trail leads first to a natural bridge, Sumidero San José del Arco. Cross it, and stop on the right. The main entrance is located at the foot of a rock wall.

The variously shaped formations are astonishing: helictites, medusas, and formations being eaten away. A large room with a deep lake over 20 meters long is located in the eastern part of the cave. An extremely muddy sump passage got the name Swamp Fever; tough mud literally sucks your boots off your feet.

Guatemala is one of the countries with the greatest unexplored karst exposure. There are limestone plateaus up to 3800 meters in elevation. The cockpit karsts of Alta Verapaz and Petén contain uncounted meters of cave. The most remote river sinks in Petén have never been reached. For example, in the vicinity of Poptún, a river disappears for 18 kilometers (as the crow flies) underground. Impenetrable jungle has kept interested people at bay.

Our trip through Guatemala led us first to Lake Atitlán and to Chichicastenango. There are fantastic market

places here. By bus and thumb, we reached the very remote and hard-to-reach Lanquín and were able to find lodging there with a very nice family.

We first visited the archaeologically very interesting Gruta de Lanquín, a river cave with the Nacimiento del Río Lanquín as its resurgence. A path through the dark show cave has been made with slippery wooden boards.

On foot, we tried to reach the hidden Lagunas de Semuc Champey, but we failed on account of the unbearable heat. By chance, we were able to put the final kilometers behind us in a four-wheel-drive Jeep. We were rewarded with a unique karst feature, a raging river cave, Cueva Semuc Champey, which ate its way through a limestone terrace. About 250 meters away, the Río Cahabón flows underground. The Sumidero del Río Cahabón is the giant sink for this wild water.

Above these caves, two springs form crystal-clear giant basins, with up to one thousand square meters of surface per travertine pool. The whole thing is a kind of sluice through virgin forest. Cueva de Araña Agua awaits chance visitors with large water spiders. Cueva de Murciélago, beneath the last waterfall of Semuc Champey, is a small, dry cave 8 meters long with bats.

On the way back to Lanquín, we could see various other speleosights, such as the Sotanito del Vacío, an unexplored small pit directly on the gravel path. We also became aware of a disappearing stream in the vicinity, later named by us Ruisseau Perdu.

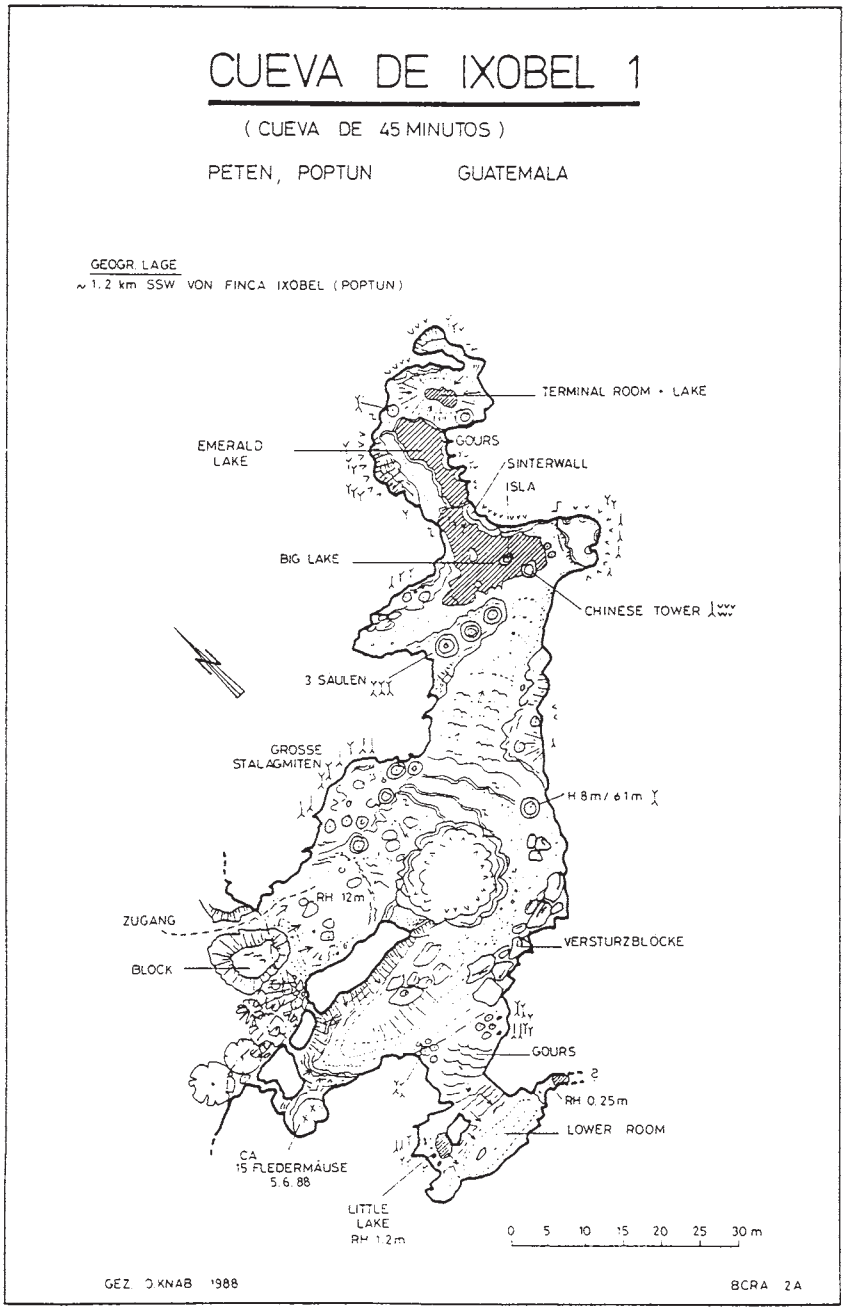
Our trip to Modesto Méndez, Guatemala, went at a snail's pace, over stony roads like, in places, dry stream beds. The bus took a full six hours to go 40 kilometers. Now and then, something popped up along this road that looked cave-like, but tropically warm temperatures made us travel on. One such place is Cueva del Norte, an entrance 2 by 4 meters directly next to the road to Méndez that probably should be checked out carefully in the future.

We spent a few days recuperating in Ixobel, near Poptún. In the vicinity, there are fine decorated caves in which we managed to take some successful pictures. The Cueva de Ixobel #1 is also known by the name Cueva de 45 Minutos. One of the Americans living here gave it that name because the hike to the cave takes 45 minutes.

The Cueva de Ixobel #2 was mapped for 105.29 meters. On the way to this cave there are diverse karst features: Las Dolinas, Snake Crack, and Cockpit Hole. The latter is a 10-meter pit with probable continuation (no rope, no descent).

El Pozo is a stream-sink shaft in a cockpit on the right of the road leading to Pajal, Alta Verapaz, about 6 kilometers after San Pedro Carchá.

Actún Can near Flores was the last cave visited in Guatemala. Here we have a very bifurcated show cave with scoured and strongly solution-etched rooms in which one can still find pottery shards from the time of the Maya.



We had decided in 1986 to visit the speleonautical paradise of Yucatán again. In order to be able to spend the coming leisure hours with raised nitrogen partial pressure, we loaded a rented VW bug with no fewer than five 80-cubic-foot tanks. The dives undertaken in the central Yucatán, to depths of 70 or more meters, also yielded the deepest underwater caves of the state. But first we contented ourselves with kilometer-long underwater systems in Quintana Roo.

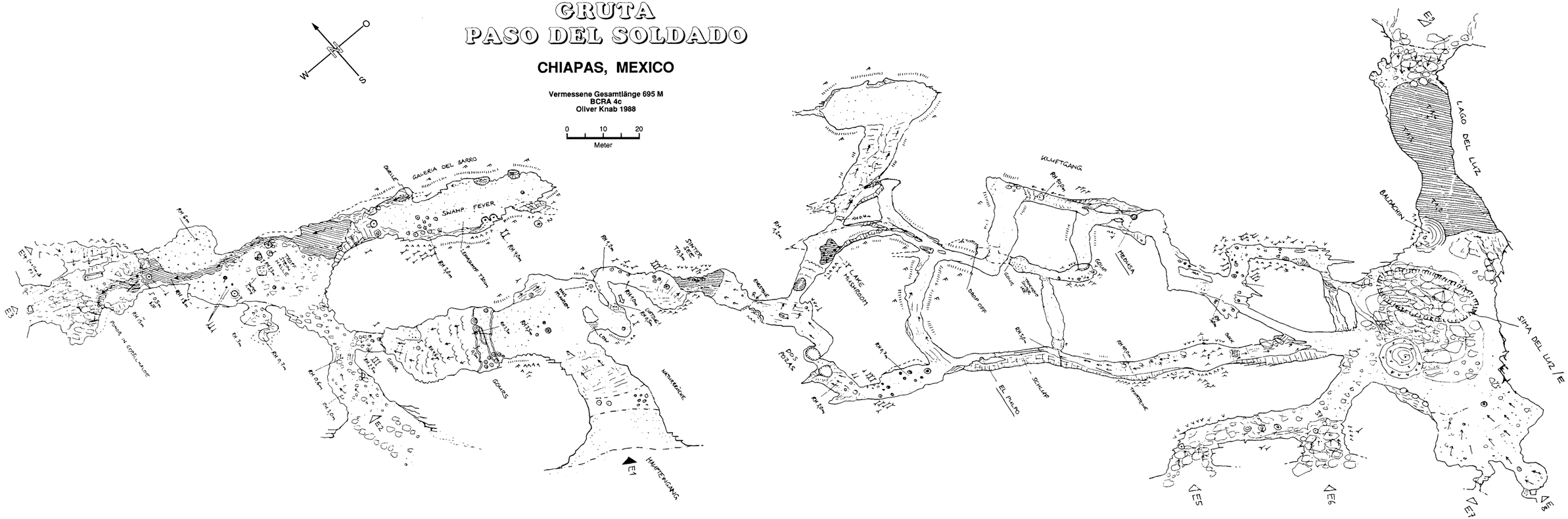
On 10 June 1988, John Delany, Larry Dickey, and I visited a previously unexplored part of the downstream section of Cenote Carwash. At our 1986 turn-around point, we continued down to the right

GRUTA
PASO DEL SOLDADO

CHIAPAS, MEXICO

Vermessene Gesamtlänge 695 M
BCRA 4c
Oliver Knab 1988

0 10 20
Meter

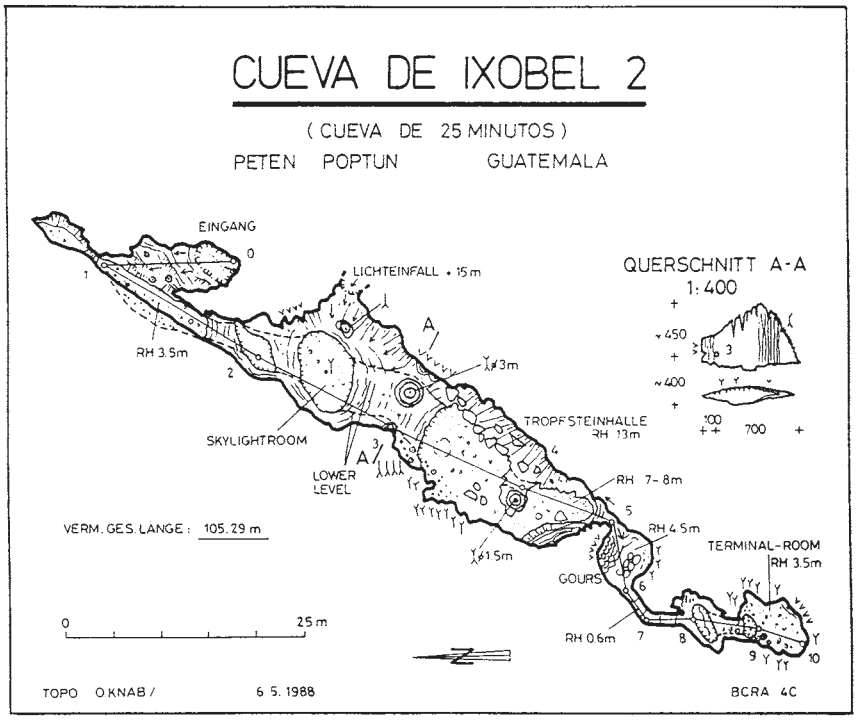


and followed a narrow 0.7-by-3-meter passage. This horizontal passage was located in a zone of mixed fresh and salt water. We turned around in Cenote Carwash at a point 150 meters from the dive entry point.

Temple of Doom is one of the most beautiful cave-diving sites in Central America. Visibility of 50 meters, snow-white formations under water, and two gigantic rooms make diving here a special experience. We followed a 3-by-4-meter passage at -17 meters to a first room, turned off to the left from there, and reached, after about 140 meters, another superb room. Four dive lines were knotted together here, each with arrow markers. It's a good idea to remember these crucial life-saving marks in order not to breathe one's last here later. We split up. While Larry and John inspected the left part of the room, I swam over to the right. From a distance of 60 meters I could see the other two divers through the halocline. In my dive direction, a passage loop led back to the first room. This cave, rigged American style, thus offers some danger, not to be underestimated, of loss of orientation. One of the iron rules of cave diving in Europe is that one dives back along the same line that one dives in on, which we held to during this dive. In a later dive in Madison Blue Hole in Florida, this problem became acute, because the experienced lead diver missed the correct turn twice.

Despite its 40-meter visibility, Cenote Naharón is a dark project because of the black oxidation layers on its walls. At a depth of 20 meters, we dived west for 300 meters. The beautiful spring basin is imposing, with its glowing green algae.

Then we had enough of displacing water horizontally and set our sights on deeper goals. After the VW bug was stuffed to the roof with a most impossible amount of gear, we steered first towards Cenote Timul, Yucatán, always a clear favorite among super cave-dive sites on the planet. After the obligatory shotline was installed from 0 to 50 meters, a decompression tank was stationed at -15 meters. At 7:56 AM, I went down in free-fall to -50 and there fixed the guideline to a sunken tree familiar from 1986. Sharply over to the right, I dove down the massive, steep, slimy wall and ended up a bit too far to the right. Unexpectedly, a wall popped up in front of me at -72 meters, stopping my progress. That wasn't in the plan. Consequently, I rose up a little and floated in the other direction along the slope at -65 meters. Above a small rock outcrop I tried to turn on the 50-watt



lamp, succeeding only with difficulty. During this maneuver, the dive reel slipped away and landed perfectly visible next to the rock outcrop, 7 meters beneath me. I dove down and retrieved the reel.

Bottom-time had reached the point that my carefully-planned ascent had to begin. For general sightseeing there wasn't much time left; nevertheless it was clear that the Cenote Timul is over 80 meters deep. Whoever wants to visit the nether reaches of the Timul should go with a special heliox mix to counteract nitrogen narcosis. The author has already undertaken plans along these lines and is looking forward to a new deep dive project. Difficulties are to be expected in the realm of support personnel and a non-existent portable decompression chamber.

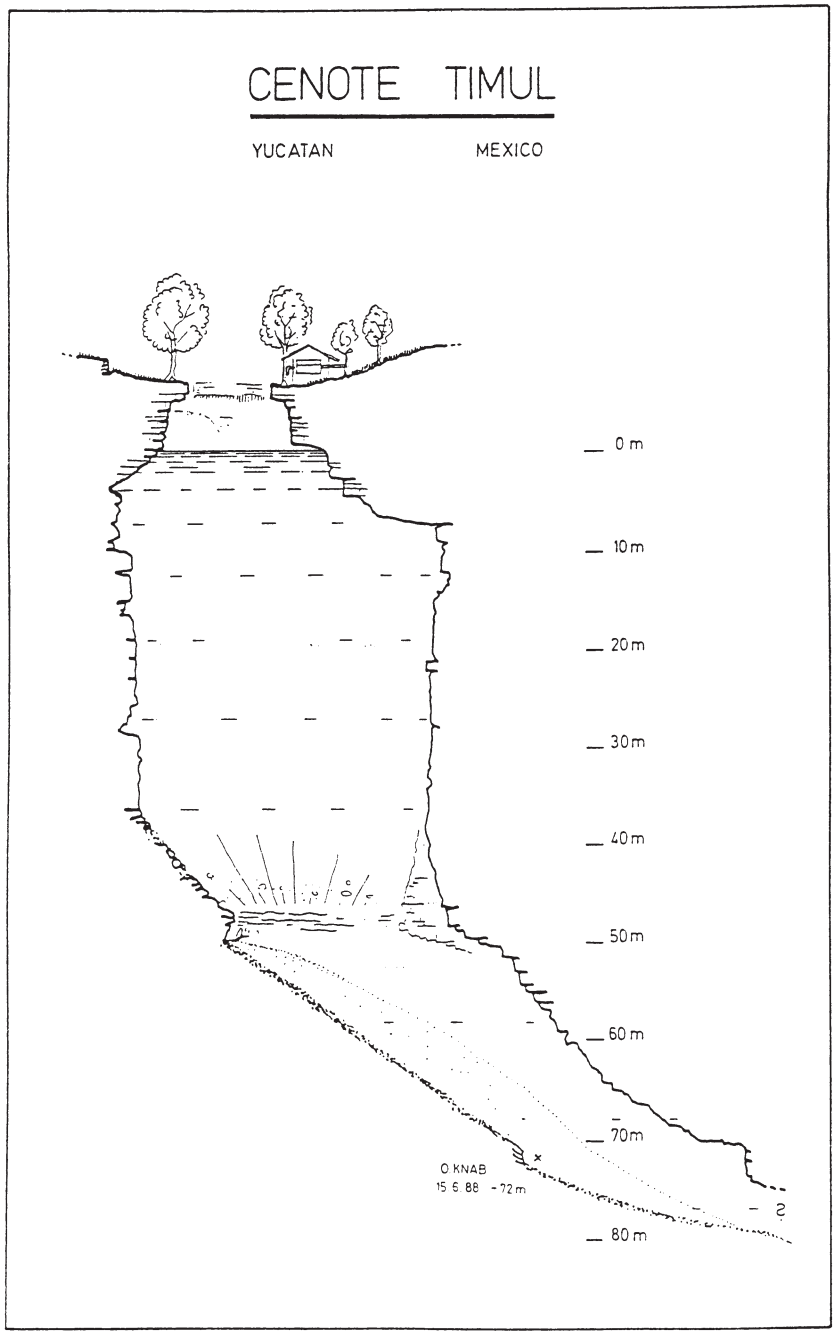
On the way to another ultra-deep cenote, several other sites were checked for dive potential. Cenote Xtojil has ancient carvings from the Mayan age to admire above the water level. Under water, this limestone hole was not a good target, barely 2 meters visibility and only 13 meters deep.

On the main road from Mérida to Chichén Itzá lies Cenote Chiuan, a grotto worth visiting, with a broad adjoining lake that could be traversed with a boat. The cave is lit at times, and it has been made a show cave by a couple of sharp businessmen.

Further activities are planned at the cenotes mentioned below, so their locations will not be given specifically. Cenote Chimay has a plumbed depth from the ground surface of 80.8 meters, making it one of the deepest pits in the Yucatán. From 16.4 meters under the earth, 64.4 meters of clear water sparkles. These statistics should suffice to cause an attack of nerves in any marginal cave divers.

In the middle of a village, across from the local bar, lies a black hole with a wall around it. It bells out into a dome beneath and falls 18.6 meters into a circular lake. Cenote I has a plumbed depth of 33.1 meters. Cenote Makil and Cenote Salliucil are two other leads from the people of the village, but they couldn't be checked or measured because of a lack of time.

After a drive of a few hundred kilometers out of Akumal, with intermediate stops at cenotes Timul and Chimay, we finally reached another remote village and tried to find helpers for the transport of the heavy special equipment for my plan in Cenote Ucil. Quite a special watercourse is located in this cave. Beneath the lake's surface of 10 by 16 meters, there's a 95.24-meter-deep underwater pit. An exact plumb from the ground surface gave the sensational depth of 108 meters, exactly vertical, surely first place in the Yucatán. The water in the upper section is bright yellowish green; it gives the cave a magical effect when rays of sunlight enter. Here, too, a decompression tank was deposited at -15 meters. On 16 June 1988 at 10:09 AM the dive began.


CENOTE TIMUL
YUCATAN
MEXICO
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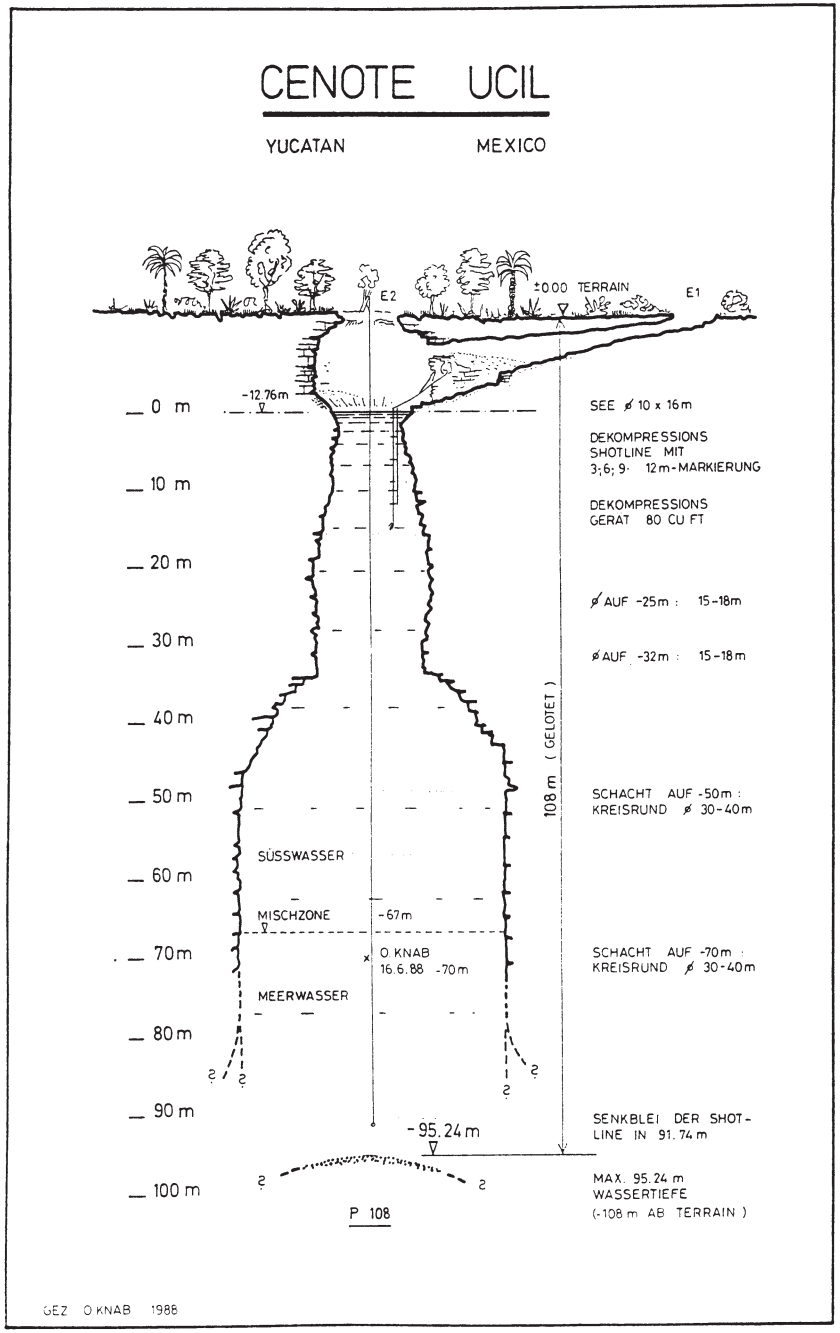
10 m
20 m
30 m
40 m
50 m
60 m
70m
80 m
O.KNAB
15.6.88 -72m


CENOTE UCIL
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MEXICO
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20 m
30 m
40 m
50 m
60 m
70m
80 m
90 m
100 m
SEE ø 10 x 16m
DEKOMPRESSIONS SHOTLINE MIT 3;6;9· 12m-MARKIERUNG
DEKOMPRESSIONS GERAT 80 CU FT
ø AUF -25m : 15-18m
ø AUF -32m : 15-18m
108 m (GELOTET)
SCHACHT AUF -50m : KREISRUND ø 30-40m
SÜSSWASSER
MISCHZONE
-67m
O.KNAB 16.6.88 -70m
SCHACHT AUF -70m : KREISRUND ø 30-40m
MEERWASSER
-95.24m
SENKBLEI DER SHOT-LINE IN 91.74m
MAX. 95.24 m WASSERTIEFE (-108 m AB TERRAIN)
P 108
GEZ O.KNAB 1988

The tightly stretched shotline disappeared in an unreal fashion vertically beneath me. The pit has an estimated diameter of 15 to 18 meters between the surface and -30 meters. At -40 meters, the shaft widens to an oversized tube of about 30 to 40 meters diameter. I floated slowly ever deeper and watched my depth gauge: -50, -55, -60, -65.... The little round point of light above me moved ever further away. Suddenly I had trouble reading my depth gauge; everything was mildly out of focus. Rapture of the deep? No, I had just crossed the halocline, a zone of mixed salt and fresh water. At -67 meters, I was slowed by the heavier sea water, and I could see the weight bob on my shotline at -91.74. Because I was still in the zone of mixed water, I still couldn't see the floor of the pit. At -70 meters, at 8 bars pressure, nitrogen made itself felt for the first time, acting like a narcotic. I decided to turn around to -65 meters to try for better acclimatization. The symptoms vanished, and I made a second attempt to dive deeper. Depth made itself felt again, and further forays into this marginal area didn't seem advisable. Therefore, I immediately began a slow ascent at 5 meters per minute, a major aspect of a safe decompression. The long ascent time adds to "bottom time," though, and must be taken into account. After 61 minutes of decompression at -15, -12, -9, -6, and -3 meters, the dive ended after 1 hour and 20 minutes.

Near the same village, the Cenote del Iglesia, about 40 meters deep, was also visited, but it could not be plumbed because of access difficulties.

Shortly before our departure for Florida, a dive site at Palancar Reef with the telling name Las Cuevas, near Cozumel, was checked. Sponges in bright colors and all kinds of beasts would make the underwater photographer stare enthusiastically; limestone addicts probably wouldn't get an adrenaline rush from it.

Finally, we paddled around in Cenote Sac Actún for over one thousand underwater meters (round trip) in Paso de Lagarto, the main passage to the right, and to the north.

Buceo de Cuevas en México

En 1988 el espeleobuzo de Suiza Oliver Knab visito sobre setenta y cinco cuevas y resurgencias en México, desde Chihuahua hasta Yucatán, mapeando varias cuevas incluyendo Cueva Paso de Soldado con 695 metros de longitud. La cual se encuentra en El Parque Nacionál de Montebello. Buceando también el Cenote Ucil a una profundidad de 70 metros y el Cenote Timul a 72 metros.

SANTA ANA '90 EXPEDITION

Alan Warild

January 1989. It soon became apparent that Greg Tunnock and I were not the first cavers to visit the area. The locals spoke vaguely of a group of foreigners, definitely not Americans, who had visited the area, seven, or was it thirty, years ago. Of what caves were found our hosts knew little, but they all agreed that one of them kicked a beehive while abseiling near the entrance and got stung badly. Unlooked-at entrances at 1800 meters with a six-square-kilometer catchment must be rare, but I could recall no rumors or articles about Santa Ana, an easily reached village only 5 kilometers north of San Jerónimo on the well-traveled road to Huautla, so we pushed on to take a look. What we found could only be described as an excellent entrance, taking a healthy stream. A large, boulder-strewn stream passage continued for about 50 meters to a minor constriction 1.5 meters in diameter. After that the water dropped down the first pitch, and we had to get back over the hill to San Pedro for the night.

The next day we were back with caving gear ready to get as far as possible in what looked like a seriously wet cave. Fortunately, considering the limited time we had, we spotted a large dry passage some 40 meters in. It had a real constriction. The squeeze was initially blocked by a few rotting logs, but a good breeze was getting through, and a pitch was visible beyond.

We got down about one hundred meters that day, stopping when we ran out of rope, still in excellent passage with no sign of previous entry. On our third day, Greg was so sick with "turistas" that I was left to push on alone down almost continuous pitches in nice gray marble with flowstone eroded to give a nice wood-grain effect. The pitches remained in the comfortably easy range of 5 to 30 meters, and I ran out of rope at about -200 meters. The only note to spoil the day was when the presidente informed me that he had revoked our *permiso*—and we had no bargaining power and 250 meters of rope in his cave.

The haggling next morning centered around the usual treasure and the known fact that gringos make money out of everything they do, but Greg and I did get into the cave again, knowing it would be our last chance for a while. We surveyed down to what later computed to -214 meters, and with our one remaining rope we descended the last pitch. Below that, the huge passage narrowed down to a hole between boulders, appeared to change direction, and dropped down a large inclined rift that I estimated to be 100 meters deep. At this point we began to feel a little extended, so we began the climb up to begin the derig, getting lost once or twice along the way. The villagers were nowhere to be seen as we lugged our overladen packs through the sleeping town at 2:00 AM.

So, what to do when faced with a great cave in unfriendly territory?

Santa Ana '90. Anything is possible in Mexico, and, besides, there was a local election between our 1989 recce and the main expedition. Just to be sure, I took a good supply of glossy magazines with articles on our previous expeditions to other areas, sent a preliminary letter to arrive a month before we did, and offered to rent the nicest building in town. Oztotl was smiling at us, too. He, or someone, had built a passable road to within 100 meters of the village before the 'dozer broke.

From a fieldhouse of unusual luxury, we began work on the Wet Route in Xongo Dwi'ñi. The advance team of Mark, Jim, and I found everything clear and open and the water flow considerably lower than a year before. On our first push we began the often tedious task of rigging a flood-prone cave as safely as possible. At this rate it would take us months to get down the 1400 meters to the expected resurgence level, but with an excellent breeze, good rock, and low

Liane and Shane Wilcox on the last of the small stream pitches in the Wet Route. To the left is a 45-meter pitch, followed by a 70-meter pitch. *Alan Warild.*

Greg Tunnock on his way up during the flash flood that hit us while we were derigging. Compare to the photo on the previous page, which was taken earlier at the same drop. The flow has already dropped by half from the peak flow. *Photos by Alan Warild.*

water flow we'd put up with it.

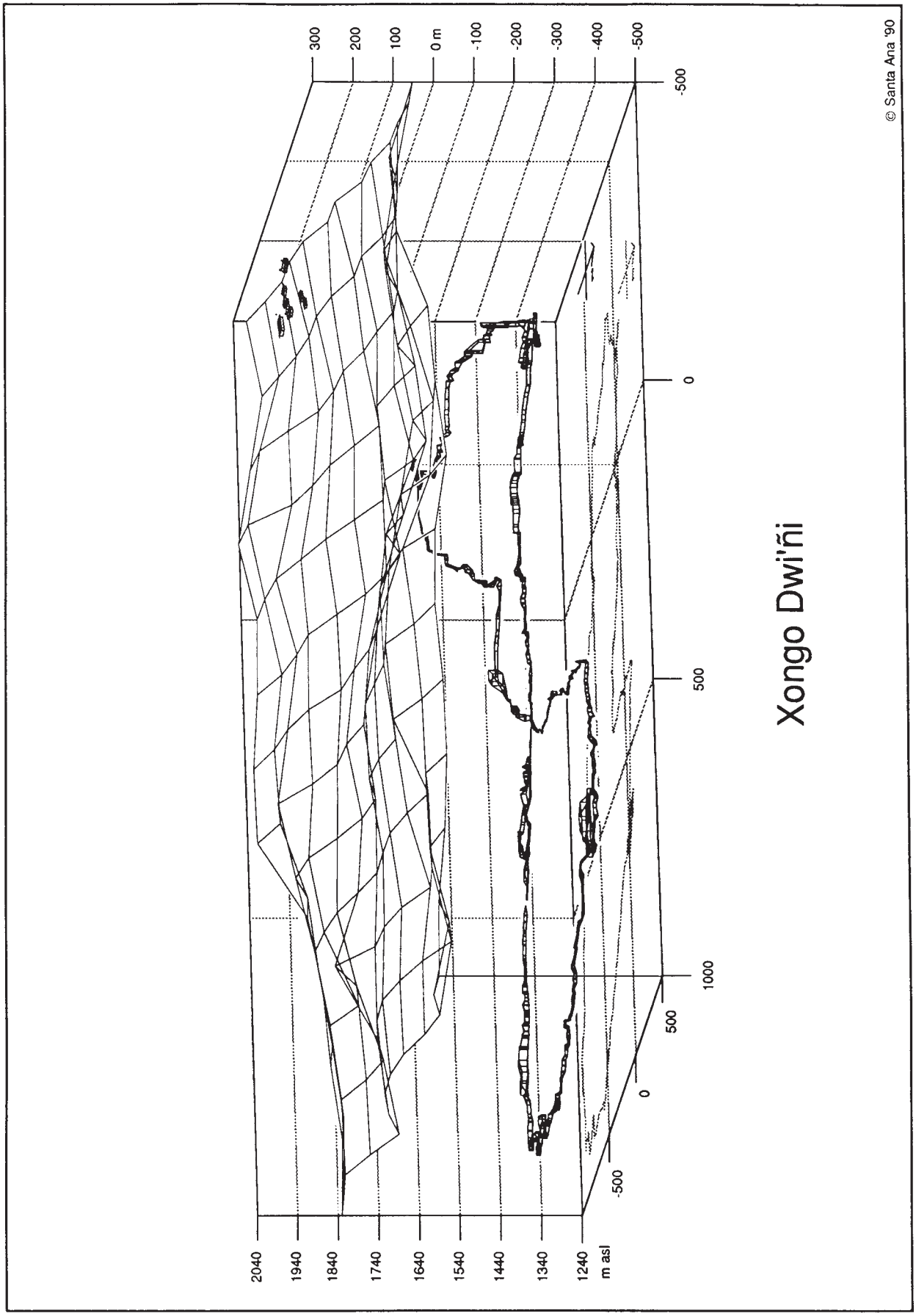
The second push saw the cave go more vertical, down drops of 40 meters and 70 meters. This second pitch, the Wet Mirror, could become quite nasty in high water due to its constricted cross-section. We just touched down, at the end of four ropes knotted end to end, on the wrong side of a large pool. The swing across to the start of the rift beyond was quite something. The rift itself was the first quiet place for hours and led to the Gymnasium, a wonderfully climby section of pools, steps, jammed logs, and eventually a pitch.

At this stage reinforcements began to arrive to speed up exploration. In one trip, Mark and Jim brought the survey down to the base of the Wet Mirror at -270 meters, while Shane and I took a compulsory shower in the Waterworks, then wandered on down two kilometers of easy walking passage. From the interesting maneuvers of the Waterworks to the first sump, the only minor interruptions to the large, level passage with its small stream flowing easily along were the occasional rockpiles. The sump, however, kept us entertained for some time. After exhausting all the easy possibilities, we decided there was no easy way. The dive was less than one meter, with a small communication tube above it. Once through, I took off down the passage to take a look, and 5 meters later I was hit by the breeze again. Following it back upstream I popped out of a beautifully camouflaged passage just behind Shane. Simply moving a few steps away to tidy up our gear made the passage difficult to see, obviously one of those nasty existential caves I'd heard of, only there because you know it's there.

The next obstacle was most definitely there. The roof dropped to 40 centimeters above water level, and the stalactites hung level with the water. By careful maneuvers I got through with a dry nose. In this much smaller passage the wind was really moving, and I had been wet long enough to begin feeling cold. I zipped down to a cold-looking pool, took a glance, and bolted for home. Shane and I had scored more than our fair share, and it would take us at least two trips to survey it.

From the log: *Mark and Jim took off in search of the ongoing lead in A1* [Xongo]. *The promised deep swimmable pool turned out to be a yucky muddy sump, so we came to a grinding halt 5 meters beyond the previous day's limit of exploration. Up a quick climb, then down the other side, soon saw us past "sump 2." Alas, approximately 80 meters farther down the streamway it sumps again—sump 3—and no bypass was found. Midway between sumps 2 and 3 a large inlet and its adjoining passage were explored for approximately 200 meters back up its streamway.*

Xongo had rapidly ground to a halt, and survey and exploration trips to the end were beginning to take 12 to 15 hours. This led to "rest" days slogging up and down the surrounding hills in search of other entrances, then the inevitable total rest days when the mist and rain were so thick that even a walk to the shitter became an epic. Several caves were found, but nothing inspiring when compared with Xongo, so after feeding our visitors, Rolf and Anne, to the flooding cave in the


Xongo Dwi'ñi
© Santa Ana '90
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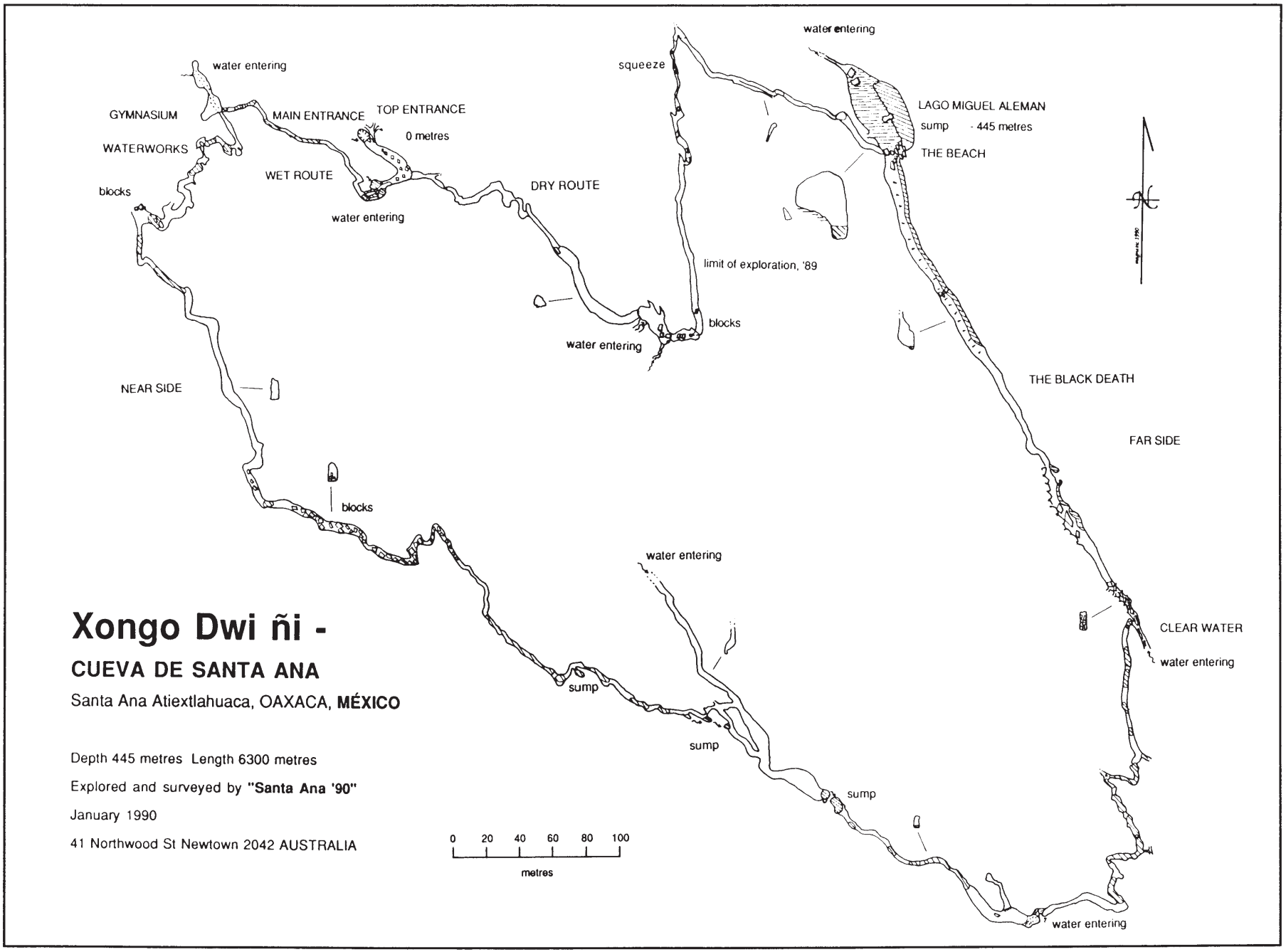


Xongo Dwi ñi -

CUEVA DE SANTA ANA

Santa Ana Atiextlahuaca, OAXACA, **MÉXICO**

Depth 445 metres Length 6300 metres

Explored and surveyed by **"Santa Ana '90"**

January 1990

41 Northwood St Newtown 2042 AUSTRALIA

hope that some new eyes would find a sump-3 bypass (they didn't), we somewhat despondently began to rerig the Dry Route. After three days of rain, "dry" actually meant "less wet," so even redoing the Dry Route proved to be a great day's sport. At the bottom of the 100-meter rift the cave went, *but only via some unpleasant passages and two squeezes in particular. Eventually the rift and shattered zones gave way to open, half-meter-wide rift with the stream below and a light breeze heading out.* Mark and I stopped due to lack of carbide with the altimeter claiming -400 meters.

The squeezes were in fact so horrendous that there was a sudden upsurge of interest in finding new caves, but apart from Jim and Liane's efforts in Ning'dó (A10), a roughly 200-meter pit developed in a rift, other caves stopped at the bottom of the first pitch or soon thereafter.

Finally, courage for the evil day was summoned: *Al, Jim, and Mark pushed the Dry Route, though the squeezes and down to a rockpile 150 meters beyond the last stopping point, where they hit the major stream again. Downstream went to a large chamber and lake, which looks decidedly terminal. Upstream is about 2 kilometers of passage* [the Black Death, due to the brittle, black-coated rock] *to the downstream side of sump 3, but no bypass was found. The trip out then took 6.5 hours. Halfway between the rockpile and sump is an equal or larger inlet with clean blue-green water (as opposed to the main stream littered with Ariel packets, sticks, sombreros, etc.). Time 18.5 hours.*

The very thought of having to return through those squeezes to complete the survey helped us find and explore more small caves, but apart from one with a nice jaguar skeleton, Nita Xaing'd, nothing of great significance was found.

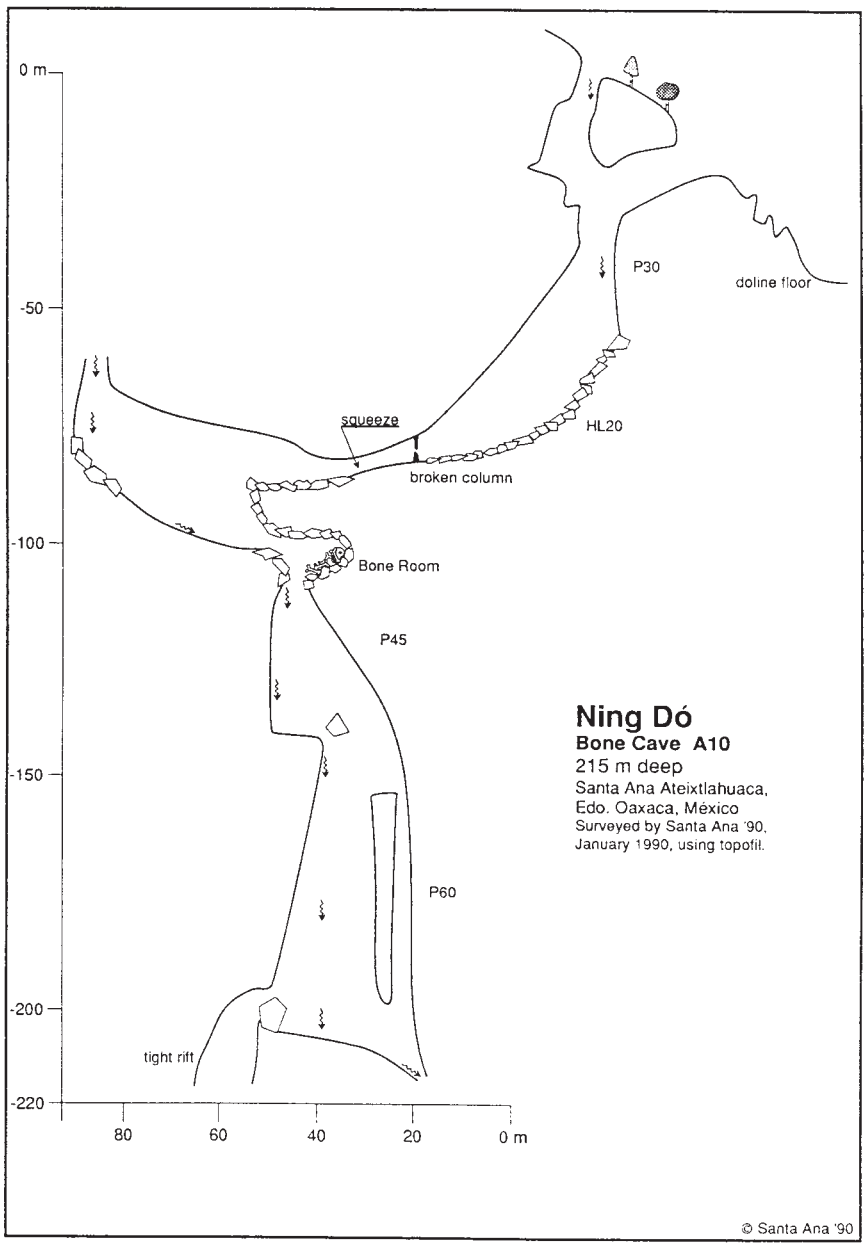
Three days later, *Shane, Liane, Al, and Mark left early and headed to the Dry Route, all to survey. Al and Shane lost the raisin and scored the long trip surveying from the terminal lake upstream for 2 kilometers to the third sump. Liane and Mark got to survey from D0* [the end of the earlier survey] *to the terminal lake—650 meters of squeezy shit. Mark and Liane out at 2:00 AM, Shane and Al out at 8:00.*

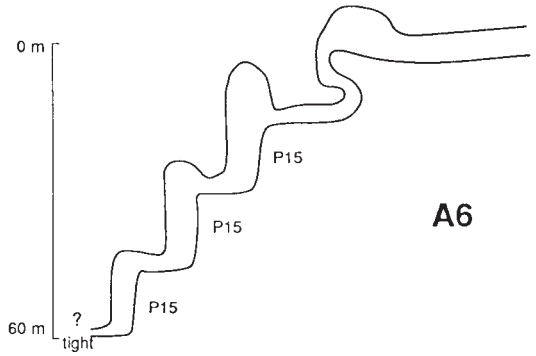
Finally, Dave and Carey found a cave of some significance and numbered it A40; it never got a name: *A40. Major discoveries: mega bone pit and three large pots and a very elusive draft. All major downward pitches were checked, but due to the phreatic nature of the top part of the cave, passage may have been missed. This was verified on the way out by standing at the top of P10 and freezing from the inward draft.*

Despite a considerable amount of scrub bashing, no great new holes were turned up. All that remained was to derig Xongo and take a quick surreptitious look at a possible stream sink to the northwest in the next municipio. The derig should have been easy, but Oztotl's boss is Tláloc, and he sent us a downpour that changed the rather low flow of some 20 liters per second to a thick brown 500 liters per second in ten minutes. *With Mark well on his way above, the four of us settled in to see if it came up further or dropped. As Dave and Jim were settling in, Mark popped his head over the edge above them. "You're gunna get fuckin' hungry if ya stay here!" The flood was already dropping quickly, so we went out, taking "after" photos on the way up.*

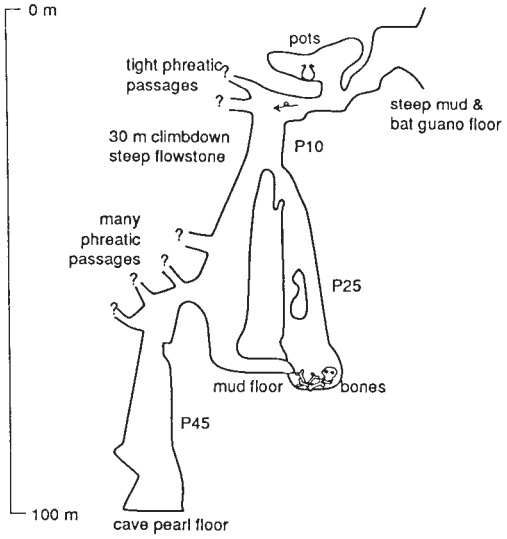
The other stream sink in the area choked about 20 meters in; it may feed the large inlet in Black Death. Anyway, our rent was due, so we moved on, leaving behind a great cave.

(Although I have no definite information, it seems that an Austin or Canadian group stayed for about a week around 1970, right before the local politics got too ugly for cavers for a few years. They found Xongo Dwi'ñi—could hardly have missed it—but it was sumped about 100 meters in, probably at the constriction 50 meters in, just before the first wet pitch, and the Dry Route was also blocked. [This is probably the 1971 trip described in *Canadian Caver* no. 4, pages 45-50—ed.] Another find was Sloth Cave, probably

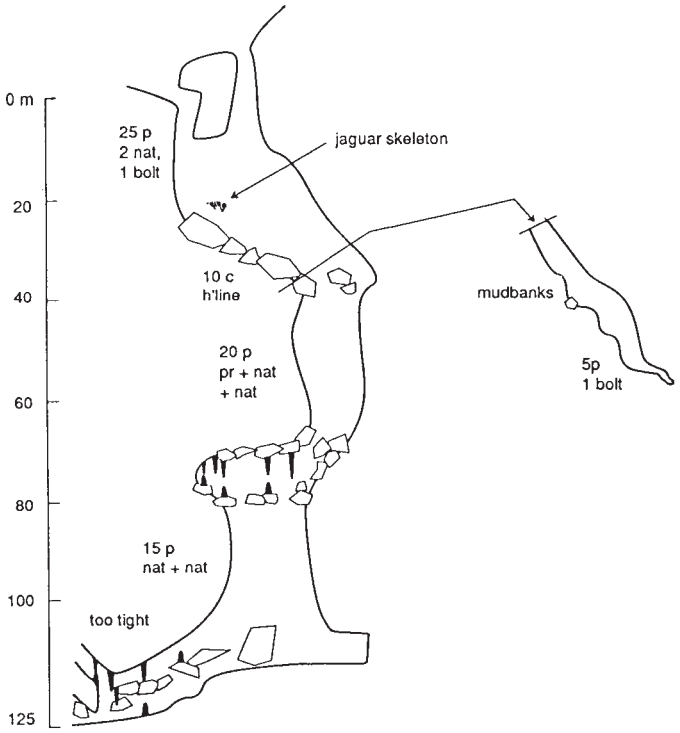


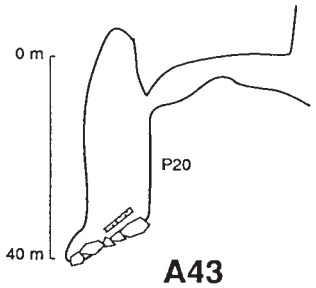


A6



A40
100 m deep
Santa Ana Ateixtlahuaca,
Edo. Oaxaca, México
Sketch by Santa Ana '90, January '90

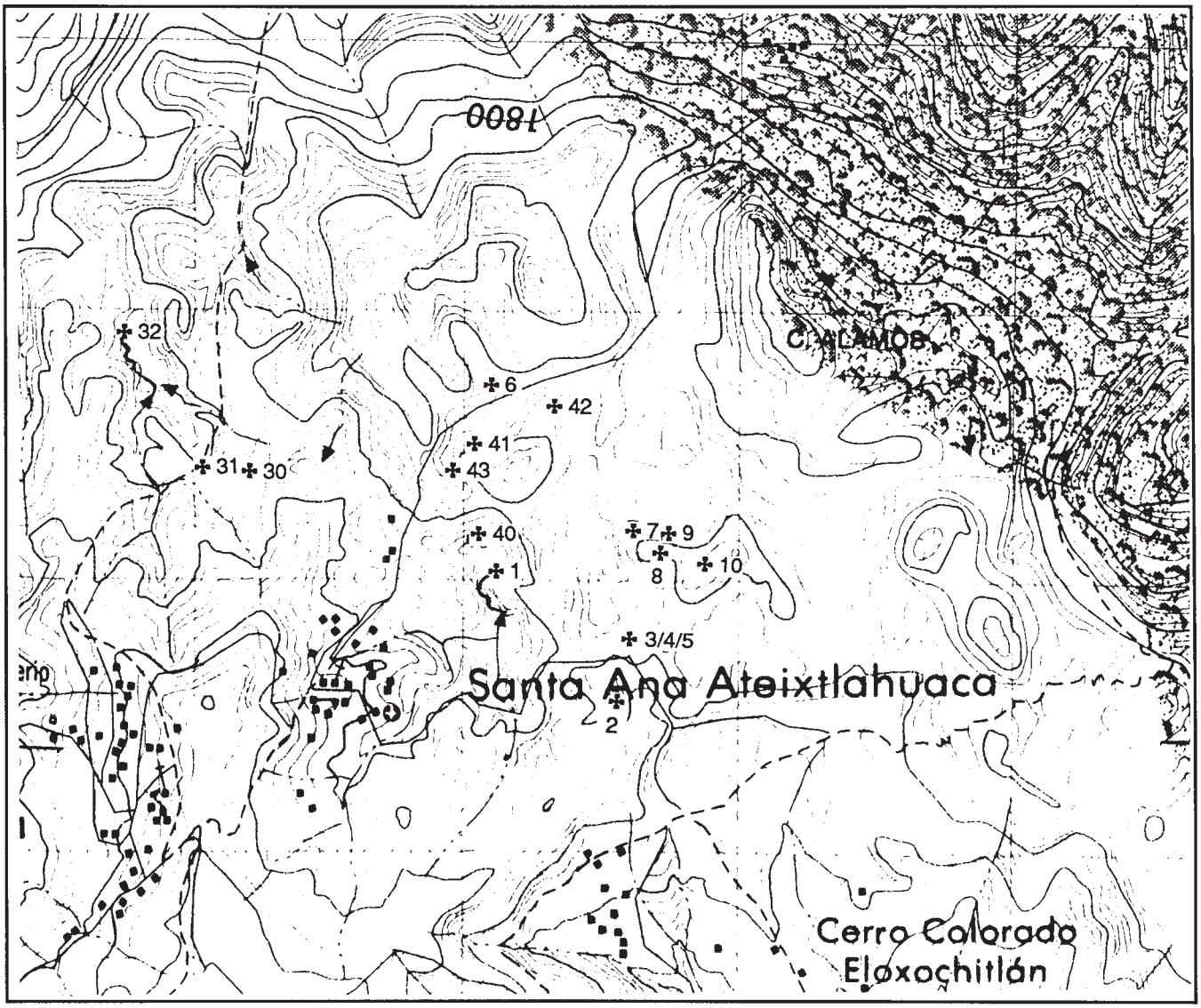




A43

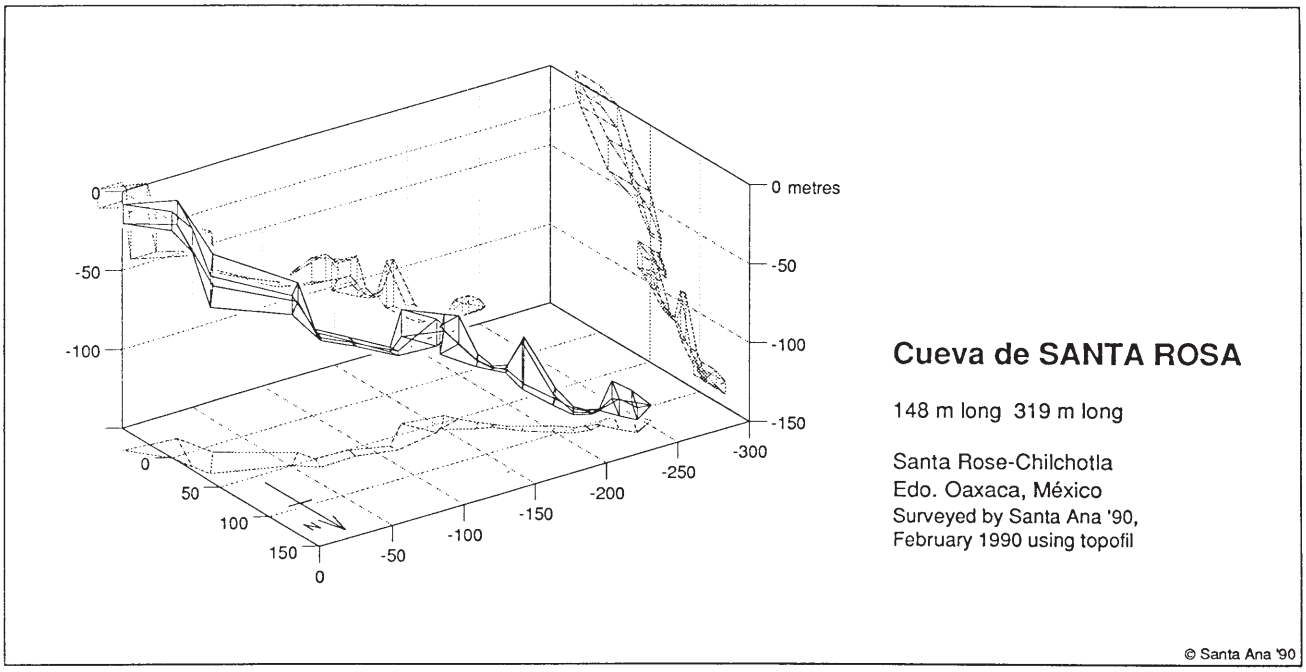
Nita Xaing'd A41

125 m deep
Santa Ana Ateixtlahuaca,
Edo. Oaxaca, México
Sketch by Santa Ana '90, January '90
altimeter control



Taken from the **HUAUTLA** 1:50,000 sheet (1 km grid)

Santa Ana Caves: **A1**, Xongo Dwi'ñi, 445 meters deep, 6.5 kilometers long. The main cave of the area. It has multiple small upper entrances just north of the main entrance. There are also these leads: Shaft inflow above last pitch in Dry Route. Meandering stream entering 50 meters below last pitch in Dry Route. Several inflows in Dry Route. Inflow at north end of Lago M.A. Inflow before sump 3 at end of Wet Route only explored for about 200 meters. Clearwater inflow in Black Death unexplored. Inflow on opposite side of wet pitch 1. And of course the cave may one day wash clear to allow passage beyond Lago Miguel Alemán, the terminal lake. **A2**, a large entrance in a doline with waterfall. **A3**, a small hole beside the track. **A4** and **A5**, poor holes in cornfields. **A6**, approximately 60 meters deep, tight and unpleasant to a choke. **A7**, about 50 meters deep with a 30-meter pitch. **A8**, about 40 meters deep, three pitches, 6, 12, and 8. **A10**, Ning Dó, 215 meters deep, developed in a rift with minor horizontal development, some pots and bones. **A30**, about 20 meters deep, nice looking dry sink with one pitch. There is also a rumored cave north of A30. **A31**, about 30 meters deep, big entrance in large doline, one pitch. **A32**, about 25 meters deep, not marked with number, active sink, climb down a narrow rift, then horizontal to a rock and debris choke, no airflow. **A40**, about 100 meters deep, twin walk-in entrances to large chamber with abundant flowstone, bats and pots, three pitches. **A41**, Nita Xaing'd, about 125 meters deep, dry streamway at base of large streamway, 25-meter pitch to large chamber with jaguar skeleton in north corner, two more pitches to bottom, good breeze. **A42**, about 45 meters deep, 30-meter shaft to rift. **A43**, about 30 meters deep, shelter cave high up doline, walk-in to 25-meter pitch.



Greg Tunnock in the stream passage in Xongo Dwi'ñi, between the second pitch and the beginning of the bigger pitches. *Alan Warild.*

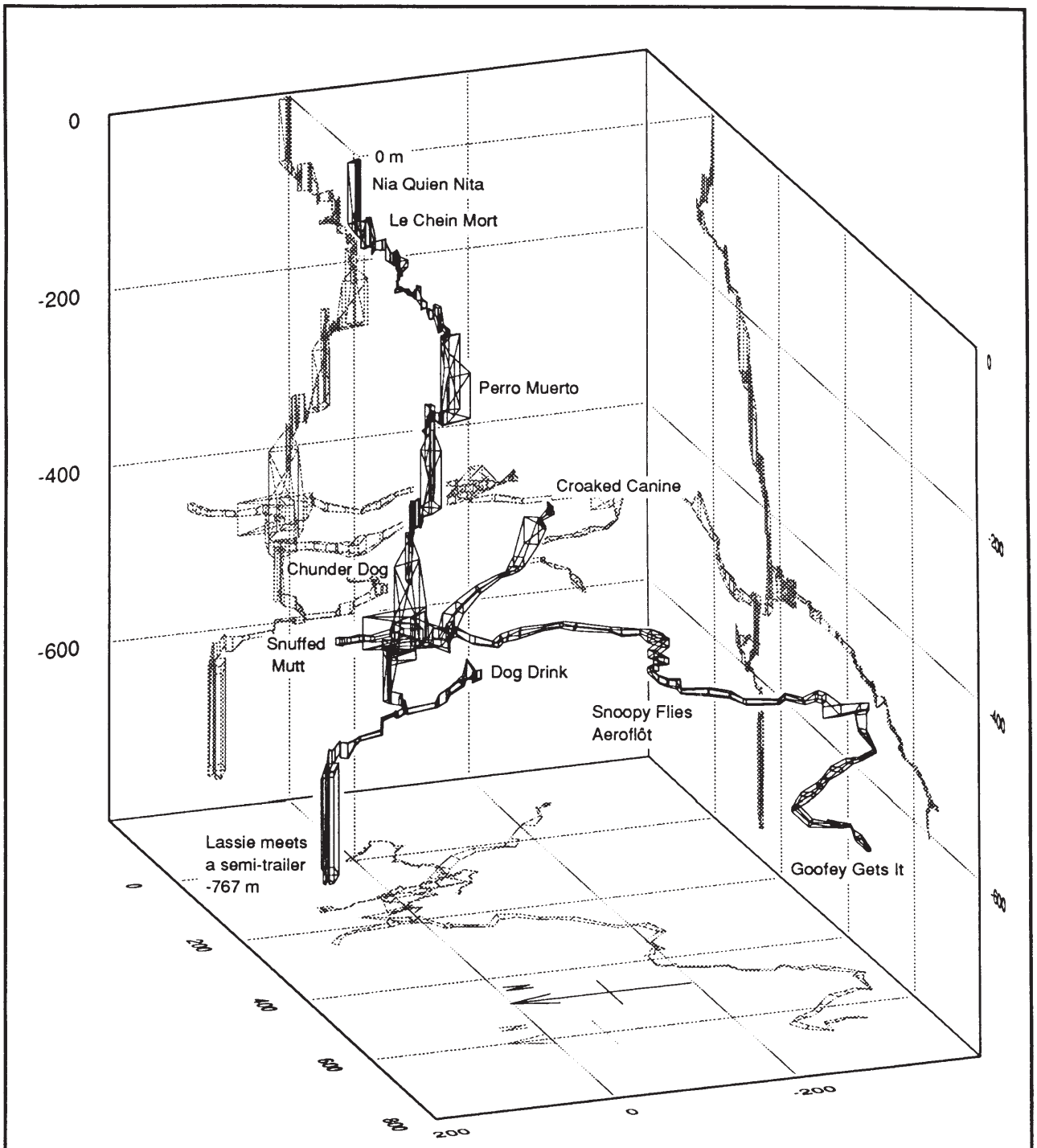
our A40, a cave with numerous bones where they found a piece of skin with fur attached. This was later stolen when they were searched by the army. All this goes to show that adequate research can be misleading and that a cave is never dead. Even Lago Miguel Alemán may one day go to its resurgence.)

Members of the first phase of the expedition were Carey and Dave Barlow, Jim Blyde, Greg Tunnock, Alan Warild, Liane and Shane Wilcox, and Mark Wilson. We were visited by Rolf Adams and Anne Gray.

El Edén is a small village forty minutes walk east of Chilchotla, in the Sierra Mazateca. A new road to within 300 meters of the village should have been passable since the end of 1990. Cueva de El Edén was first visited during the Chilchotla '87 expedition (*AMCS Activities Newsletter* 18) and briefly explored to the first obstacle, about 100 meters in. The cave is beneath the village, just beside the school, and the villagers enter it during the dry season to collect water from the standing pools. A fuller exploration was made enroute from Santa Ana to Zongolica. Cueva de El Eden was explored over two days at the end of January and finished in an area of narrow dividing tubes at -276 meters. The cave is 948 meters long and is developed at the top of a shale bed dipping at an average angle of 30 degrees. It runs down-dip with no large drops, and few of any size. The floor and walls are formed mainly of soft, slippery, and crumbly rock, with the only solid rock forming the roof. Added to this is an abundance of soft white cave coral or moon milk, large amounts of village effluent, and several large (OK, giant, at 10 centimeters in diameter) spiders, and it ranks as one of those caves that would have been better not found. The cave can be regarded as fully explored and unworthy of further effort.

Immediately to the right (south) of the new road from Chilchotla towards Río Sapo, just past the locality of Santa Rosa, is the large, obvious entrance to Cueva de Santa Rosa, 148 meters deep and 319 meters long. The impressive walk-in entrance, with its large roof hole, slopes down a steep boulder slope with some large logs and becomes progressively narrower, passes through a sizable chamber, and eventually reaches a crawl. Beyond the crawl, the roof curves down to meet the flat mud floor with no obvious leads.

With Xongo Dwi'ñi "finished" and El Eden not worth finishing, members of the Santa Ana '90 expedition decided to spend their last month tidying up loose ends at Zongolica, Municipio de Chilcholtla, Oaxaca. Two full-scale expeditions to the area in 1985 and 1987 had explored many caves and left nearly as many unfinished leads. (See *AMCS Ac-*



NIA QUIEN NITA

- Dead Dog Cave

767 m deep 3.1 km long
Zongolíca -Chilchotla,
Edo. Oaxaca, México
Surveyed by Santa Ana '90,
using topofil, January 1988
and February 1990

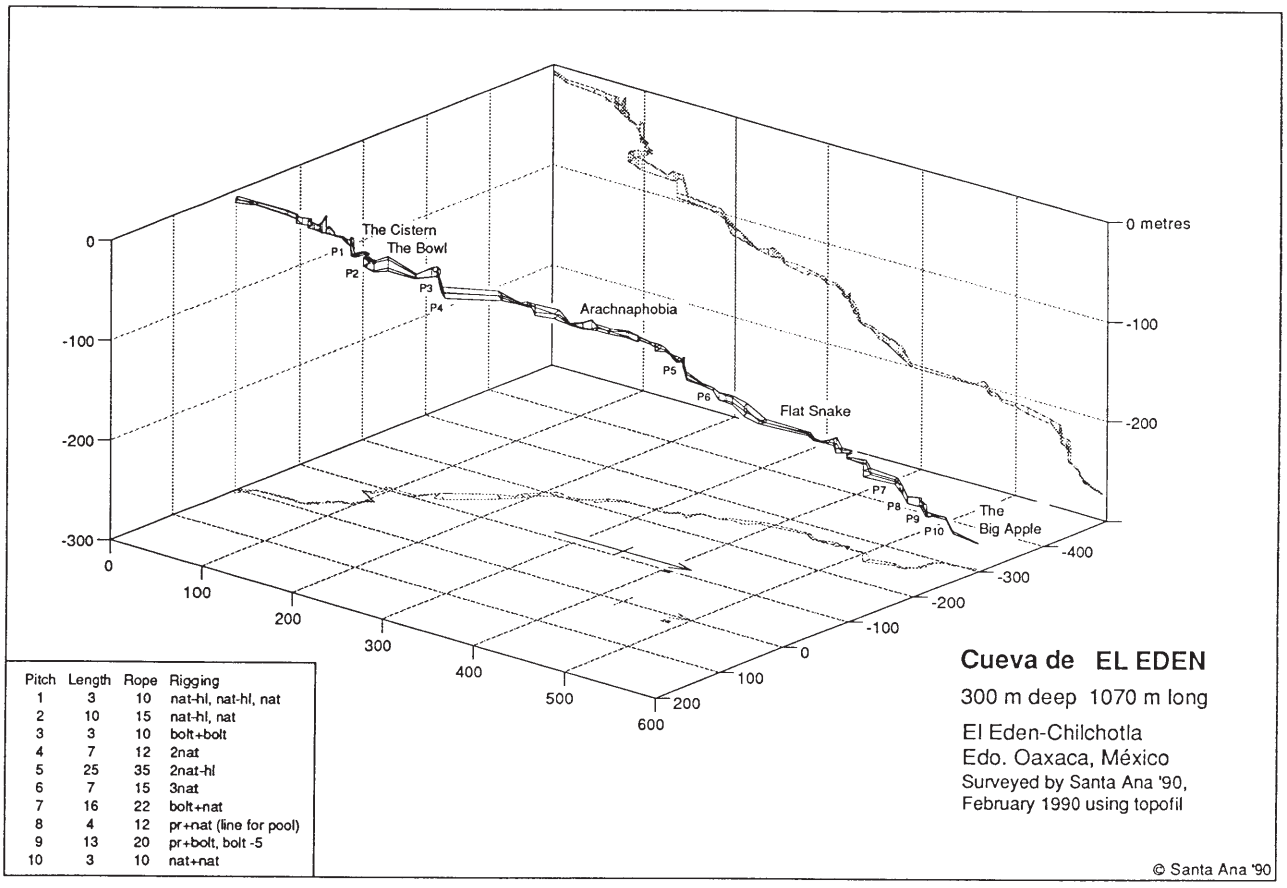
tivities Newsletter 16 and 18.) Some of the deep caves have question-mark leads near the bottoms, and there were several entrances as yet unentered. Add to this the large areas that required more detailed prospecting and the rumors of caves; we could not stay away too long. Base camp was once again set up in the village of Zongolica, and within a day we were on our way down new caves. Of the many checked, time, equipment, and personnel forced us to concentrate our efforts on two main caves.

X'oy Tixa was found and explored in early February 1990. Tixa is an uncompromisingly vertical cave of modest dimensions, 813 meters deep and 1124 meters "long," although the maximum horizontal displacement is 100 meters. The only really open passages are some of the pitches.

A large drop-in entrance with a walk-in side hole leads to an unstable boulder pile overhanging the first pitch. Below lies a series of short pitches to a tight squeeze, followed by the first sizable pitch, 45 meters. After a tight, unpleasant passage through The Starting Blocks, dirty boulders forming the floor of the cave, there is a rift that drops 300 meters continuously on rope, including an on-rope squeeze, to a small streamway. This streamway constitutes the only pleasant part of the cave, once past the squeeze. The meandering streamway is cut into good black rock with numerous pitches ranging from 5 to 40 meters. Just when Tixa looks like it may become bearable and you may even forgive it, the water disappears down a tiny hole at -700 meters. The cave should end here; unfortunately it doesn't. A dry bypass lined with mud and interspersed with squeezes drops the last 100 meters to a crumbly, worthless choke. There are no large pitches, and the passage is so difficult that it took us about twelve hours to explore it. No leads were found in this region, and the nature of the passage does not lend itself to further investigation. The most hopeful lead is back up at about -140 meters, where a drafting passage is still going after three pitches.

Nia Quien Nita, or Dead Dog Cave, was first entered during the Chilchotla '87 expedition, when it was explored down the first six pitches to about -70 meters. Due to its lower entrance elevation, other caves were calling more loudly at the time. The dead dog is at the bottom of the second pitch.

In early February 1990, exploration resumed. Once past the wet squeeze at the end-point of exploration, the dog opens out again and becomes more vertical. The small stream picked up at the bottom of the second pitch is followed to about -500 meters along a small, narrow streamway interspersed with open pitches, most of them small. The two most significant are the 80-meter pitch and Chunder Dog Pitch, which drops the last 100 meters to -500 meters in a large chamber. (Ask Dave Barlow what it's like to get a touch of the *turistas* on a 100-meter pitch.) At this level, an elevation above sea level of 1000 meters, the cave shows the most un-Zongolíca-like characteristic of extensive horizontal development. One of these large fossil passages, Croaked Canine, heads toward the major concentration of Zongolica's caves to the south. Another, Snoopy Flies Aeroflôt, trends toward the Stonindo caves, west of Zongolica, and ends at Goofy Gets It at the same level as Stonindo's large chambers. The water

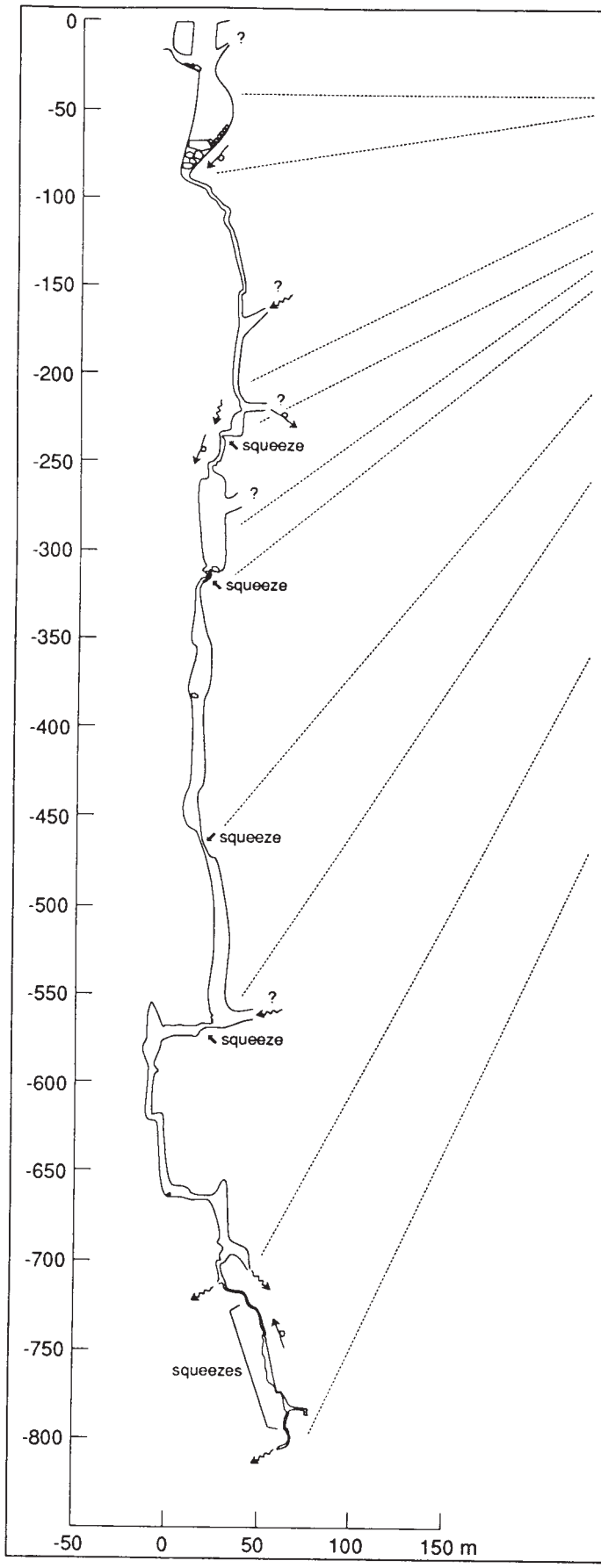


Pitch	Length	Rope	Rigging
1	3	10	nat-hl, nat-hl, nat
2	10	15	nat-hl, nat
3	3	10	bolt+bolt
4	7	12	2nat
5	25	35	2nat-hl
6	7	15	3nat
7	16	22	bolt+nat
8	4	12	pr+nat (line for pool)
9	13	20	pr+bolt, bolt -5
10	3	10	nat+nat

Cueva de EL EDEN

300 m deep 1070 m long

El Eden-Chilchotla
Edo. Oaxaca, México
Surveyed by Santa Ana '90,
February 1990 using topofil



Pitch	Depth	Rope	Rigging
1	25	40	nat+2b, r-7
2	12		nat+b, nat-6
3	28		pr+nat+b, r-9, nat-23
4	12	160	pr+nat, b-2
5	38		pr+2nat, r-5, b-12, r-25
6	9		pr+nat, nat-3, r-5
7	12		pr+nat, b-2
8	4	10	nat+b
9	11	14	nat+b (Y)
10	60	68	2nat, r-10, r-25
11	18		nut+b, b-10, r-12
12	60		pr+b, r-12, b-22
13	20		pr+b+nat (Y)
14	33		pr+b, r-12, b-20
15	20		pr+nat, r-6
16	16	310	pr+nat, b-10 (diagonal slot)
17	30		pr+b, r-1, r-14
18	40		pr+b, r-12, r-22
19	12		pr+b
20	8		pr+b
21	6	20	nat+b
22	9		pr+nat
23	8		2nat
24	18	88	pr+b
25	32		pr+b, b-3, b-22
26	4		pr+2nat
27	4	7	nat+b
28	20	25	2nat+b
29	10	14	2b(Y), r-3, pendule-8
30	5	15	2b, r-5
31	3		pr+nat
32	3	7	b+nat (climb up)
33	2		2nat(Y)
34	3	30	pr+nat
35	5		pr+2nat
36	8		pr+b+nat
37	25	34	nat+b, r-10, b-25
38	10	14	2b
39	6	14	nat+b

South↔North section

X'OY TIXA

- Man Hole

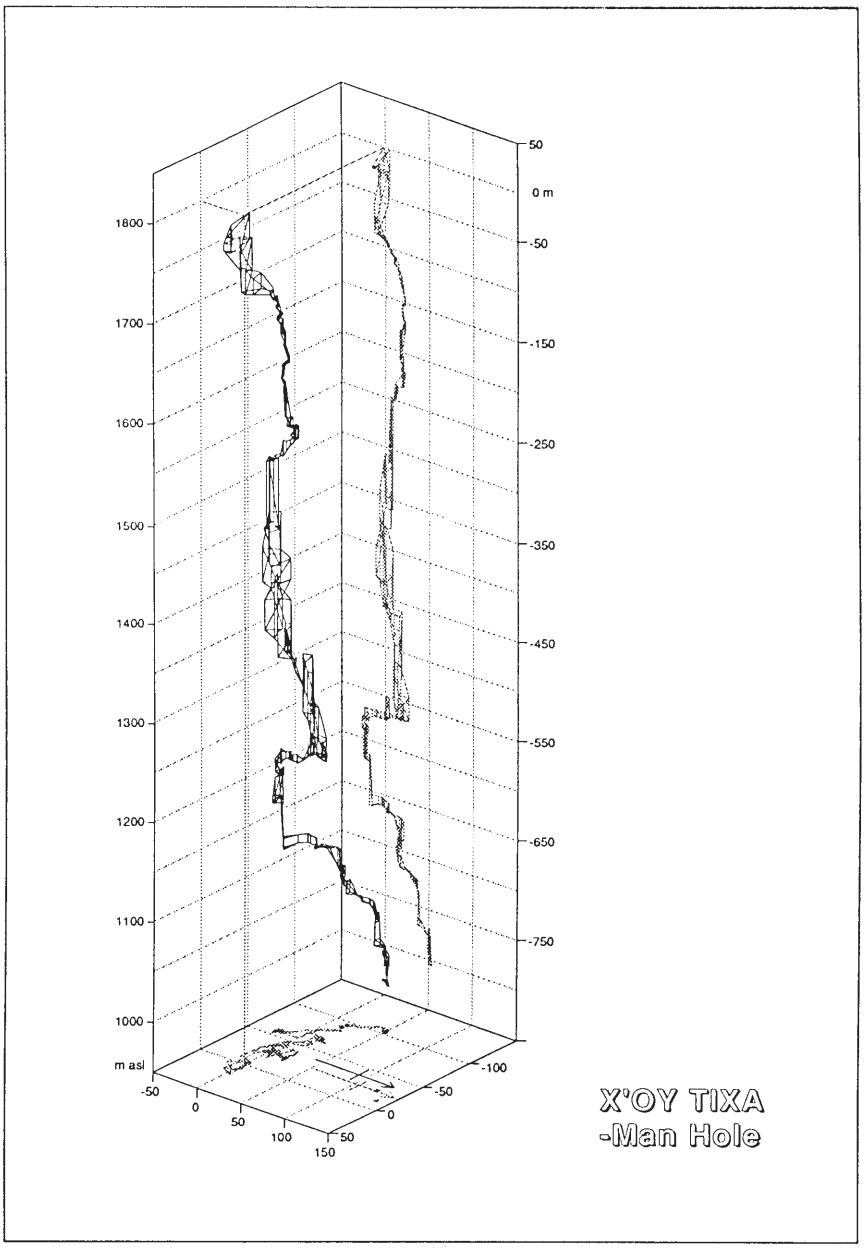
813 m deep 1124 m long

Zongolíca-Chilchotla,
Edo. Oaxaca, México
Surveyed by Santa Ana '90,
using topofil, February 1990
altimeter control

can be followed from the base of Chunder Dog down a 60-meter pitch to an excellent larger stream, Dog Drink. This can be followed downstream to a final 120-meter pitch to Lassie Meets a Semi-Trailer at the deepest point in the cave, 767 meters deep. Nia Quien Nita is 3.1 kilometers long.

Nia Quien was explored very quickly by a small group who were short of time. This led to several unexplored or unsurveyed leads and some epic derigging trips. Exploration will continue on the next expedition, and possibly a camp will be required to fully explore the extensive passages at the -500 meter level.

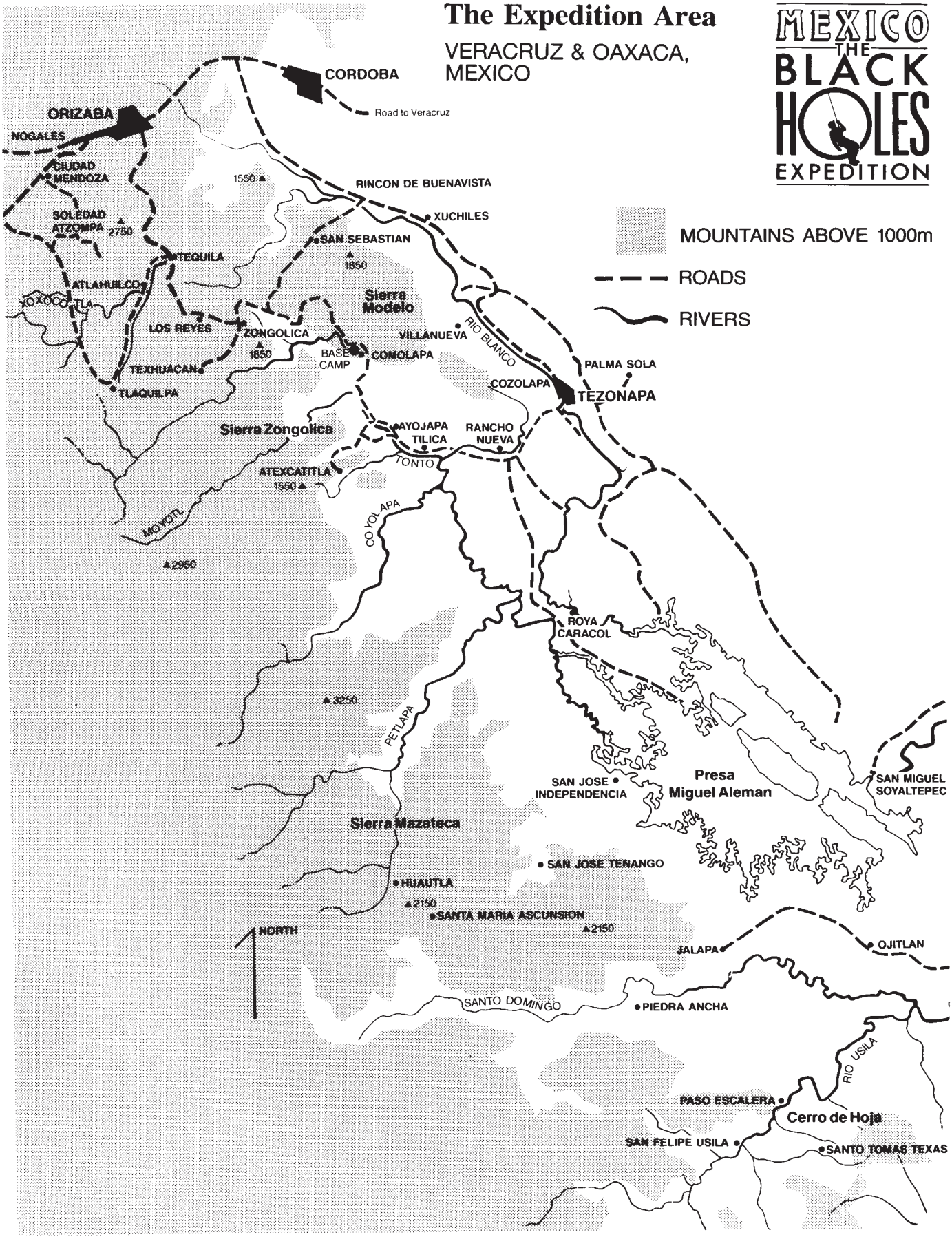
Participants in the second part of the Santa Ana '90 expedition were Rolf Adams, Carey and Dave Barlow, Jim Blyde, Steve Carrick, Anne Gray, Greg Tunnock, Alan Warild, and Mark Wilson.



X'OY TIXA
-Man Hole

Expedición a Santa Ana 1990

En Enero de 1990 un grupo de espeleólogos Australianos retornaron al poblado de Santa Ana, en la cercanía de San Jerónimo, Oaxaca, para continuar la exploración de Xongo Dwi'ñi, mapeando así 6.5 kilómetros de longitud y una profundidad de 445 metros. Dejando varios pasajes sin explorar, en Febrero movieron el campamente a Zongolica, en donde exploraron X'oy Tixa. Esta cueva desciende hasta 813 metros, casi sin pasaje horizontal alguno. Posteriormente retornaron a la cueva Nia Quien Nita, o Cueva del Perro Muerto, la cual fue explorada por primera vez en 1987. En 1990 se exploró adicionalmente 3.1 kilometros de longitud y 767 metros de profundidad, y sobre dicha cueva están planeando su próxima expedición.


The Expedition Area
VERACRUZ & OAXACA, MEXICO
MEXICO THE BLACK HOLES EXPEDITION
MOUNTAINS ABOVE 1000m
ROADS
RIVERS
CORDOBA
Road to Veracruz
ORIZABA
NOGALES
CIUDAD MENDOZA
1550
RINCON DE BUENAVISTA
SOLEDAD ATZOMPA
2750
XUCHILES
SAN SEBASTIAN
1650
TEQUILA
ATLAHUILCO
XOXOCOTLA
Sierra Modelo
LOS REYES
ZONGOLICA
1850
VILLANUEVA
RIO BLANCO
BASE CAMP
COMOLAPA
PALMA SOLA
TEXHUACAN
COZOLAPA
TEZONAPA
TLAQUILPA
Sierra Zongolica
AYOJAPA
TILICA
RANCHO NUEVA
TONTO
ATEXCATITLA
1550
MOYOTL
COYOLAPA
▲2950
ROYA CARACOL
▲3250
PETLAPA
SAN JOSE INDEPENDENCIA
Presa Miguel Aleman
SAN MIGUEL SOYALTEPEC
Sierra Mazateca
SAN JOSE TENANGO
HUAUTLA
▲2150
SANTA MARIA ASCUNSION
▲2150
NORTH
JALAPA
OJITLAN
SANTO DOMINGO
PIEDRA ANCHA
RIO USILA
PASO ESCALERA
Cerro de Hoja
SAN FELIPE USILA
SANTO TOMAS TEXAS

MEXICO THE BLACK HOLES EXPEDITION

THE 1988 BRITISH EXPEDITION TO THE SIERRA ZONGOLICA

Paul Ibberson

For many years, the speleological splendors of Mexico eluded British cavers. Save for a few lucky individuals, the big pits and subterranean rivers remained the stuff of legend. The majority of expeditionaries contented themselves with visits to the famous caving regions of Western Europe, whilst those who did venture further afield turned their attentions to the east: Greece, Turkey, Iran, and finally Southeast Asia. Mexico remained largely inviolate.

This situation was to change during the 1980s. Two years of preparation led to Mexico '82, a large, high-profile expedition, whose members spent two months based around San Cristóbal de las Casas in the state of Chiapas. Altogether, eleven kilometers of varied passage was explored, the major discovery being the resurgence of Veshtucoc, four kilometers long *(1)*.

However, the expedition was not without its problems. Access and political hassles restricted work in some areas, but the most serious problem was a medical one. Seven members of the team became seriously ill and had to be hospitalized in Mexico City, where it was revealed they had been struck down by histoplasmosis.

Despite such setbacks, the experience was enduring, and three years later some of the main protagonists of the 1982 trip organized another major expedition to Mexico. This time, the area visited was the Xilitla Plateau in San Luis Potosí, visited by several groups over the years, but apparently with plenty still to do. With the aid of information supplied by members of American and Canadian expeditions to the area, the British team was able to target new areas or ones that had received only a little attention *(2)*. As a result, a number of fine caves were explored, and a total of around eighteen kilometers of new passage was surveyed. Expedition members also made visits to some of the area's most notable landmarks, including descents of Sótano de las Golondrinas and Hoya de las Guaguas and ascents of the stunning spire of La Silleta. At the end of the trip, there were no major going leads in the areas visited to entice the team back, but, for the majority of the team, the desire to return to Mexico was great.

Even before all the loose ends of Mexico '85/'86 had been tied up, plans were afoot for another venture. A different area was sought, preferably with potential for the deep or extensive systems that had so far eluded the previous British expeditions. Following discussions with the Belgians from the Groupe Spéléo Alpin Belge, attention became focussed on the Sierra Zongolica and Sierra Mazateca, the range straddling the borders of the states of Veracruz, Puebla, and Oaxaca. We knew these mountains contained some of the great systems of Mexico, and it appeared there was further potential in a number of areas. With insufficient information on which to base a decision on the final location of the expedition, a reconnaissance was organized in the spring of 1987.

Howard Limbert and Tim Allen spent a fortnight rushing around looking at possible areas. With the help of Ramón Espinasa of the Sociedad Mexicana de Exploraciones Subterráneas, they checked out access routes and local permission arrangements. Their conclusion was that we should go for the Sierra Modelo to the southeast of Zongolica in the state of Veracruz.

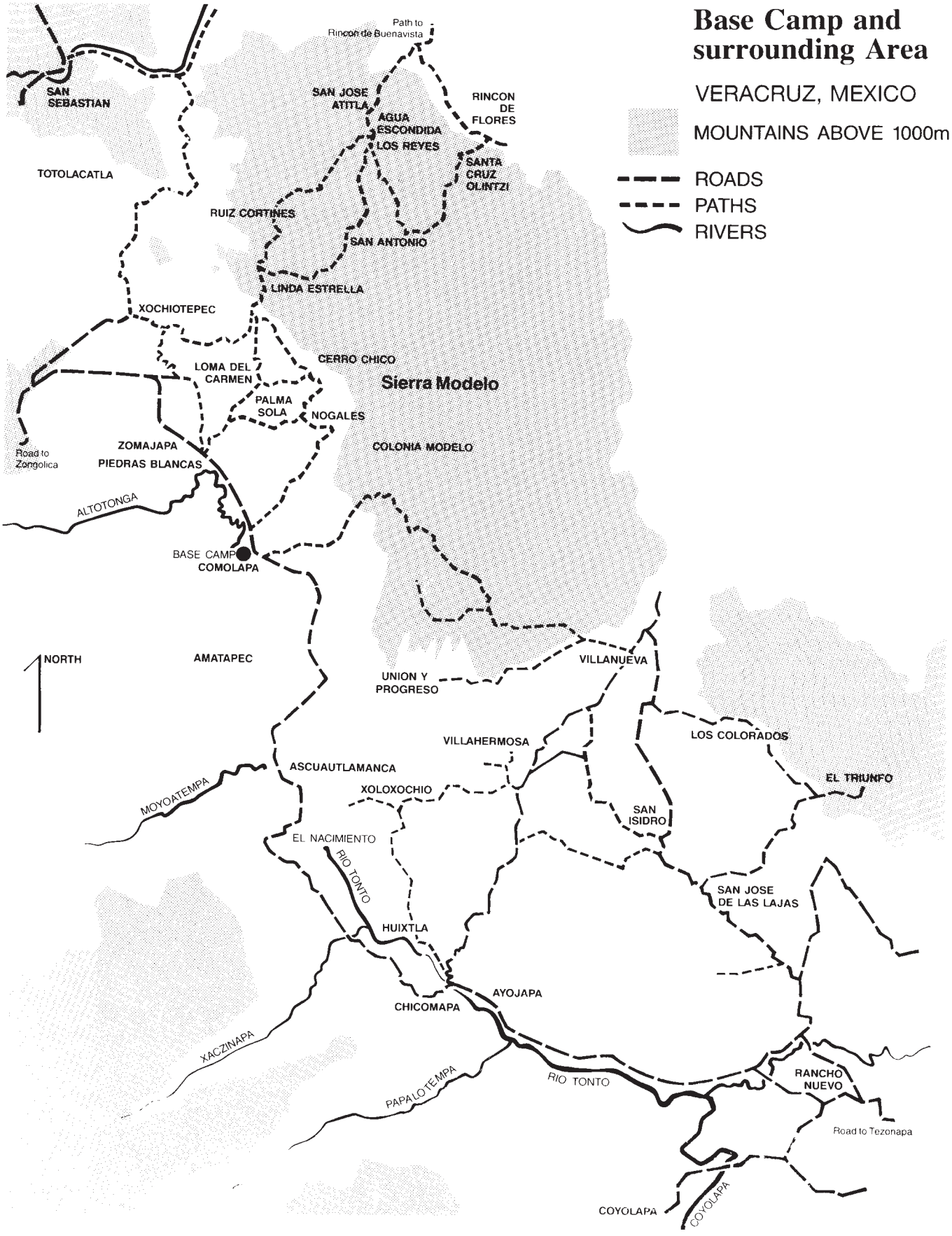
After months of often frantic preparation, the advance party left for the USA in December 1987. Their job was to buy two pickup trucks and pick up the expedition freight in Los Angeles before driving on to Mexico. In this way, we hoped to sidestep the holdups encountered with Mexican customs on both the previous expeditions. This time everything went smoothly, and by late January base camp was established in a field kindly turned over to us by the people of the village of Comalapa. The long wait was over; now it was time to go caving.

From the outset of our activities, the Sierra Modelo was our first priority. Howard and Tim had noted numerous "black holes" on the recce, so now it was just a question of finding the one that dropped one-thousand-plus meters to river level and following it. Needless to say, the practice did not quite live up to the theory.

All over the sierra people bashed shaft after shaft, only to return with the same story. "It chokes" soon became the most over-used phrase of the expedition. But we figured it was only a matter of time before we hit the big one, and groups continued to roam the hills seeking out *sótanos grandes*.

Some discoveries were truly spectacular. The Lost World was a huge pit estimated to be 300 by 80 meters and 150 meters deep at its upper end. At the lower end, a drop of 50 meters landed in dense jungle, and only the perimeter could be checked out, with no apparent way on. Equally impressive was the Sótano de Eladio Martínez (also known as the Sótano Grande de Cerro Chico), a stunning 220-meter drop. Sadly, it was the choked shaft that typified our discoveries on the Sierra Modelo.

Even the deepest cave explored by the expedition fitted into this category. The Sótano de los Hermanos Peligrosos was 391 meters deep, but still essentially a single shaft consisting of two huge, broken pitches of 128 and 186 meters, along


Base Camp and surrounding Area
VERACRUZ, MEXICO
MOUNTAINS ABOVE 1000m
ROADS
PATHS
RIVERS
Path to Rincon de Buenavista
SAN SEBASTIAN
SAN JOSE ATITLA
AGUA ESCONDIDA
LOS REYES
RINCON DE FLORES
SANTA CRUZ OLINTZI
TOTOLACATLA
RUIZ CORTINES
SAN ANTONIO
LINDA ESTRELLA
XOCHIOTEPEC
CERRO CHICO
Sierra Modelo
LOMA DEL CARMEN
PALMA SOLA
NOGALES
COLONIA MODELO
Road to Zongolica
ZOMAJAPA
PIEDRAS BLANCAS
ALTOTONGA
BASE CAMP
COMOLAPA
NORTH
AMATAPEC
UNION Y PROGRESO
VILLANUEVA
VILLAHERMOSA
LOS COLORADOS
EL TRIUNFO
ASCUAUTLAMANCA
XOLOXOCHIO
SAN ISIDRO
MOYOATEMPA
EL NACIMIENTO
RIO TONTO
SAN JOSE DE LAS LAJAS
HUIXTLA
AYOJAPA
CHICOMAPA
XACZINAPA
PAPALOTEMPA
RIO TONTO
RANCHO NUEVO
Road to Tezonapa
COYOLAPA
COYOLAPA

with several smaller drops. A month into the expedition, we had bashed nearly two hundred shafts and were still without a going cave.

In the face of constant disappointment, morale remained high, but attention began to shift away from the top of the Sierra Modelo. With the aid of the trucks, the local bus service, and two-legged donkeys (us), we began to probe the edges of the massif. The change of emphasis was to pay dividends.

Around the base of the Sierra Modelo, a number of significant rivers posed interesting questions and offered intriguing possibilities. For example, the Río Altotongo begins somewhere in the hills around Zongolica and flows south into the Comalapa polje, sinking in a doline choked with centuries worth of mud and boulders less than one hundred meters from our base camp. Some five kilometers to the south, it reappears at the Nacimiento del Río Altoco before joining the Río Moyoatempa, the combined waters then crashing down the vast portal of El Boquerón. Half a kilometer of whitewater river passage was explored to a sump by Philippe Ackermann and a French team *(3)*. Further to the south again, the waters rise to become the Río Tonto, where the resurgence provided 1.5 kilometers of sporting exploration for the Belgians of the Équipe Spéléo de Saint-Nicolas on their Expé Sous Sierra in 1987 *(4)*. Clearly, several notable gaps remained, and we set about trying to plug them.

Between the Comalapa sink and the Altoco rising, a number of caves were entered, but none could be followed for more than a couple of hundred meters, and there was no sign of the lost streamway. That was, until one morning when a certain eminent geologist (whom we will call Robert North to protect his real identity) announced that he was "off to find the Comalapa Master Cave." Such a statement was treated with the contempt it deserved until half an hour later, when he returned to reveal that he had.

In the middle of a maize field, one of the locals watched in amusement as Bob inserted himself into a "cuevita," a low slot below a small rock outcrop. The bedding immediately opened into a walking-size passageway heading downwards. Bob returned to camp to ram the cynics' words down with their breakfasts.

A larger team soon returned to C8, or Cuevita Chica, to explore this gem that had been hitherto concealed right under our noses. Abandoned galleries and chambers led onwards, until suddenly, in a small alcove off the main passage, a short pitch dropped into a clean-washed canyon in jet-black rock. Deep potholes were traversed on small ledges, the smooth, polished nature of the rock making this very precarious. Several falls into the pools gave the passage its name, Black Comedy.

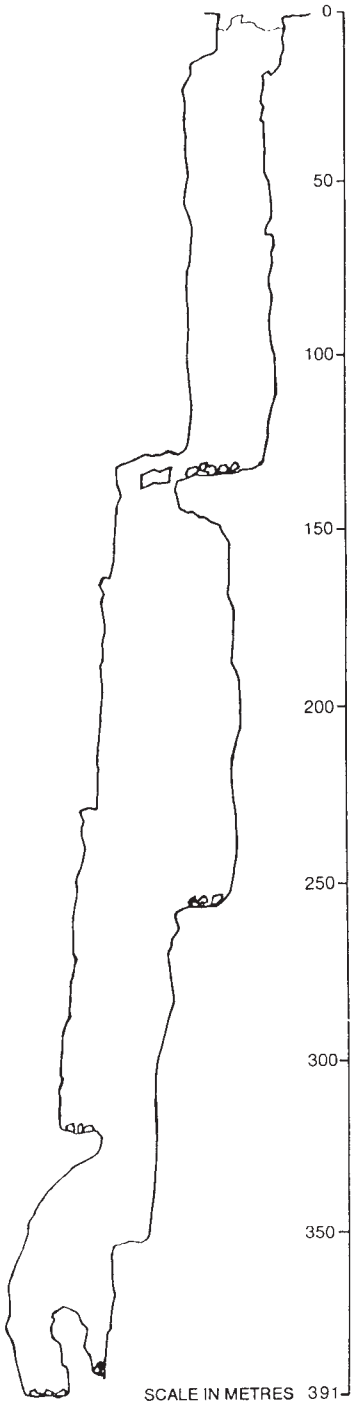
The cave was indisputably part of the main drainage below Comalapa, perhaps an overflow, but a significant part of the jigsaw. Our hopes of the master cave were soon dashed, when a major collapse blocked the streamway after a couple of hundred meters. The howling draught gave an indication of things beyond the Boulder Joke, but as repeated attempts to pass it failed, the laughs were on us. Nevertheless, it was a fine cave in an interesting location.

Further down the valley, just upstream of the Tonto resurgence, a dry streambed and sink provided another part of the jigsaw. Cueva Kimosave was followed for nearly a kilometer to a sizable pitch down into a large chamber. Belgian footprints dampened the enthusiasm of the explorers, who realized that the Tonto now had an upper entrance.

To the north and east of the Sierra Modelo, other notable finds were made. The village of Xochiotepec had some spectacular shafts and its own sumidero. The latter had virtually everything: streamways, chambers, lakes, gour halls, bats, rats, and so on. One pitch in particular provided amusement (for the onlookers), as it landed in a deep lake, where getting on and off the rope was achieved while treading water. Leaving the lake was then effected by floundering seallike up a mudbank. Altogether, another 2.2 kilometers of good, sporting cave, but not the system we were really hoping for.

As our sights turned further afield, one group took a truck ride to the eastern side of the sierra. Between the foothills and the coastal plain, they found what was probably the best "fun" cave of the expedition, the Nacimiento de Siete Aguas. Just north of the village of Xuchilez, a walk along the railway line brings you to a stream cascading down into the Río Blanco, which is *blanco* only as a result of the high concentration of froth and foam from pollutants.

Down the embankment, the bulk of the stream is seen to issue from an entrance the size of a garage door. A brisk swim upstream and through the archway leads to over a kilometer of large streamway with loads of swimming and

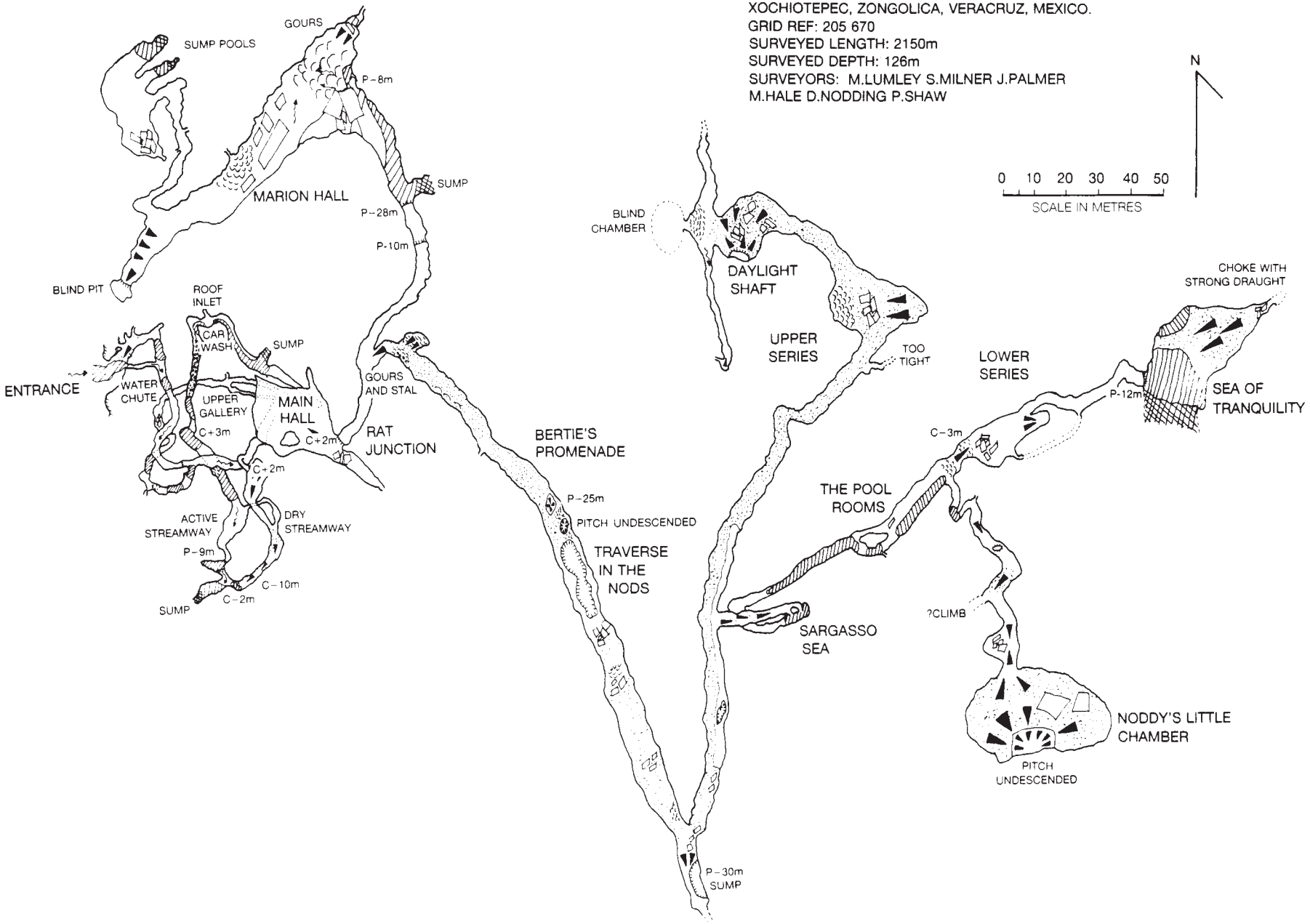


SOTANO
LOS HERMANOS
PELIGROSOS
(NOG5)

ZONGOLICA, VERACRUZ, MEXICO
GRID REF: 233657
BCRA GRADE: 5C
LENGTH:531m
DEPTH:391m

SUMIDERO DE XOCHIOTEPEC (XO2)

XOCHIOTEPEC, ZONGOLICA, VERACRUZ, MEXICO.
GRID REF: 205 670
SURVEYED LENGTH: 2150m
SURVEYED DEPTH: 126m
SURVEYORS: M.LUMLEY S.MILNER J.PALMER
M.HALE D.NODDING P.SHAW

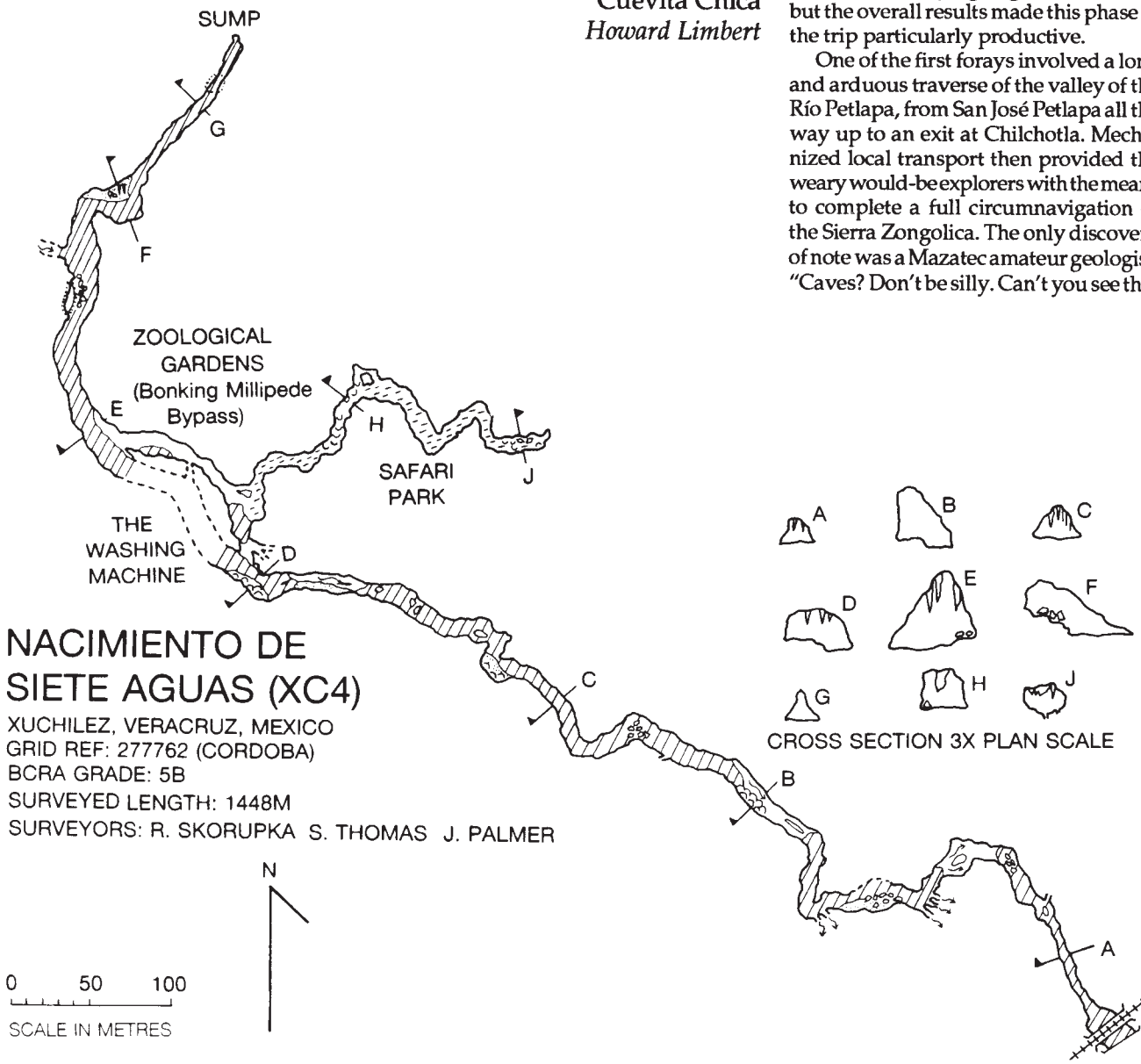


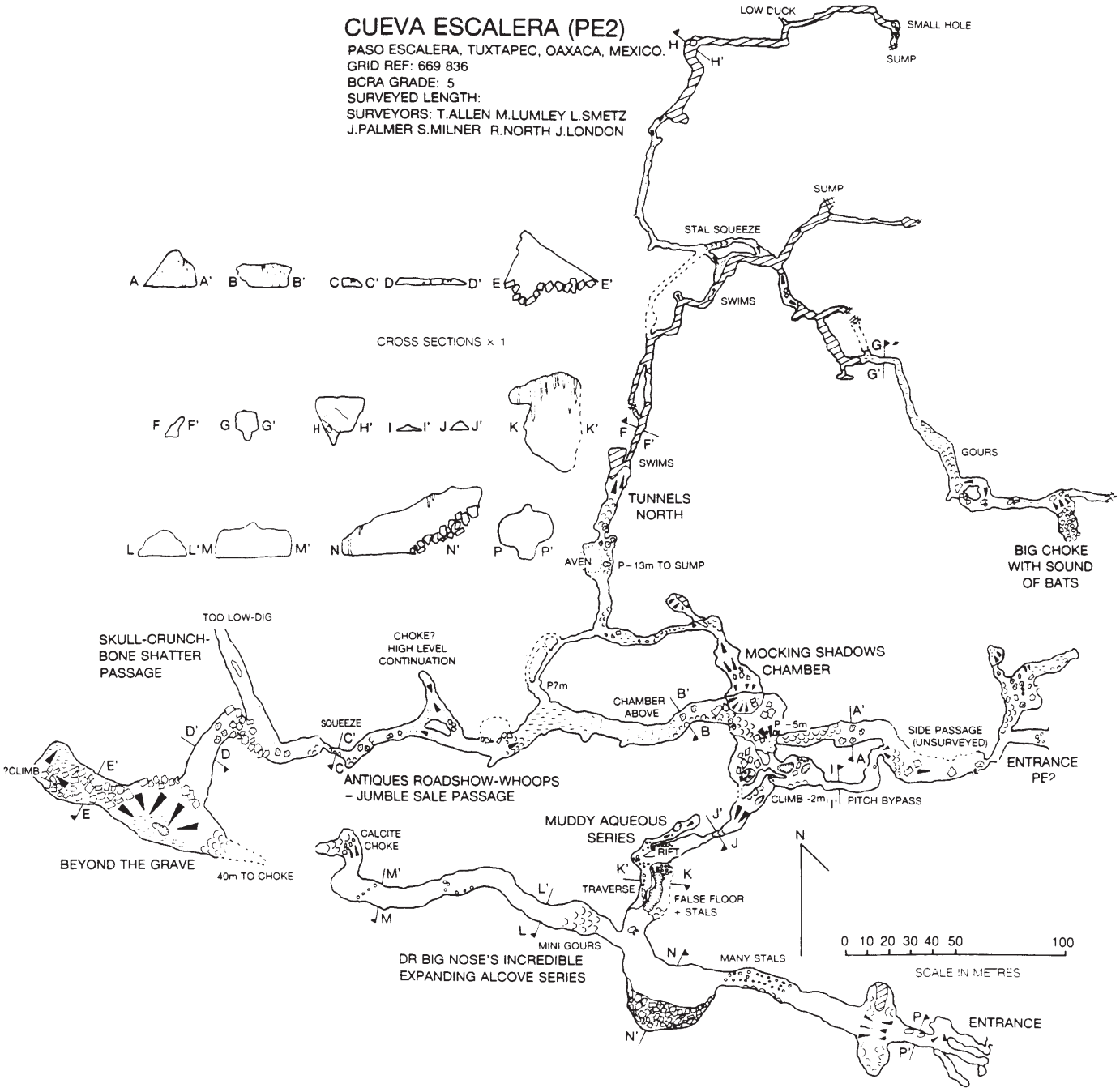
Cuevita Chica
Howard Limbert

rapids. One abandoned side passage contained so much zoology that it was called the Safari Park, and another open lead was left unpushed as histo-paranoia precluded the passing of a massive bat roost. A kilometer and a half of superb cave, but, in much the same way as the Sumidero de Xochiotepec, merely a rose among the thorns of no-goers.

During the second half of our three months in Mexico, small groups began to raise their sights to areas beyond the immediate vicinity of the Sierra Modelo. With the intention of checking out the reality (or otherwise) of the caving potential of good-looking areas, many more hours of travel time were clocked up by the team. A range of zones were visited with varying degrees of success, but the overall results made this phase of the trip particularly productive.

One of the first forays involved a long and arduous traverse of the valley of the Río Petlapa, from San José Petlapa all the way up to an exit at Chilchotla. Mechanized local transport then provided the weary would-be explorers with the means to complete a full circumnavigation of the Sierra Zongolica. The only discovery of note was a Mazatec amateur geologist. "Caves? Don't be silly. Can't you see that

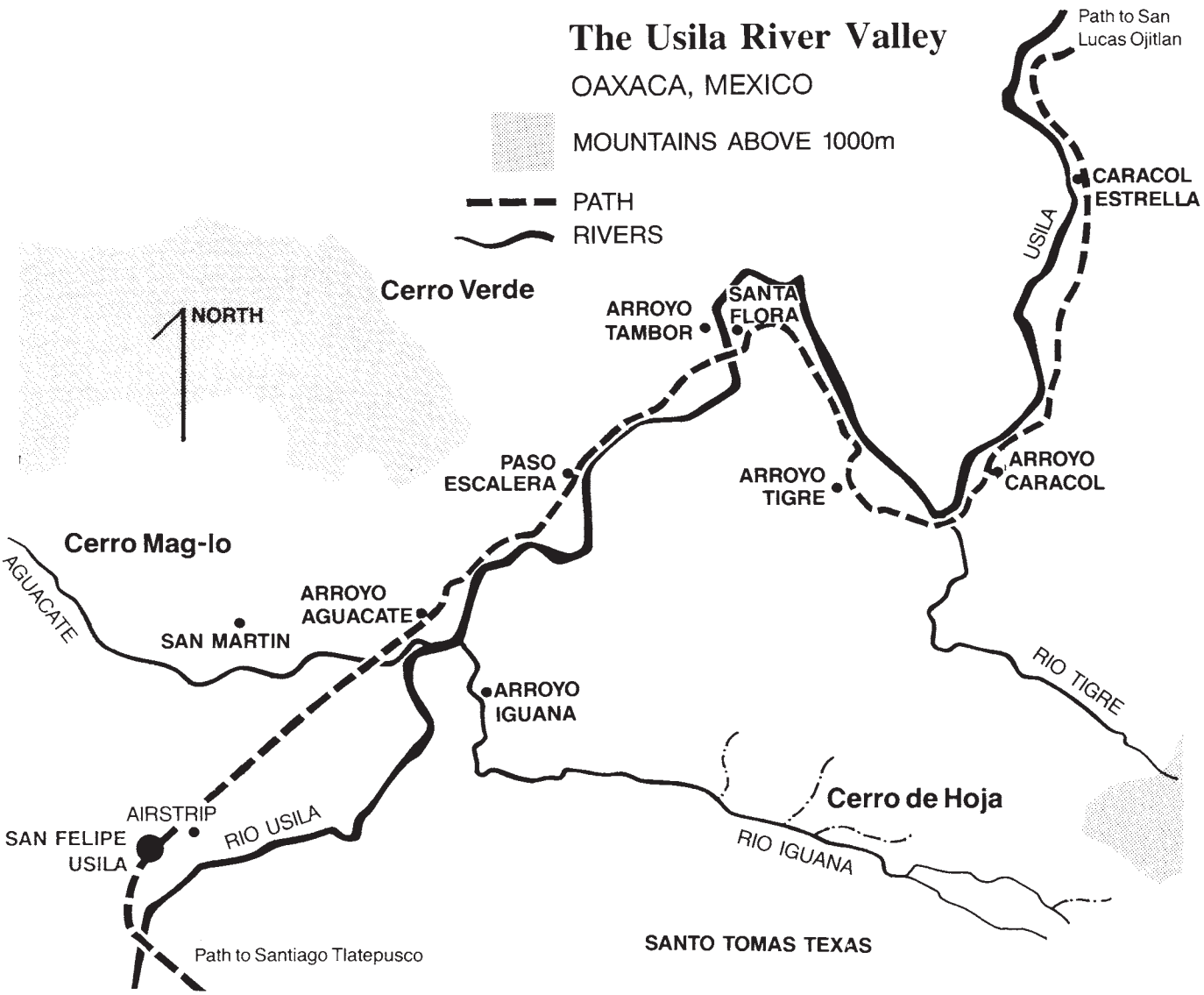




there's a localized impermeable nonconformity uplifted to the south, thus rendering the stratigraphy in this area totally unsuitable for the resurgences you seek. Here we only encounter surface drainage; all the subterranean water courses flow north. Try at Tlacotepec." Had there not already been two groups (GSAB and Société Québécoise de Spéléologie) working in the area of Tlacotepec, the impressed and somewhat embarrassed group would have gone there immediately.

In direct contrast to the disappointment of the Petlapa was a trip to San Felipe Usila. This idyllic valley lies beyond the southern boundaries of the Sierra Mazateca, across the Río Santo Domingo and well to the south of Cerro Rabón. The first group to go there thought someone was kidding when they were told, "There aren't any buses; go to the the airport." Tuxtepec "International" is a long field, and the local airline is a one-seat Cessna used to supply the villages in the Usila valley. There are no roads beyond Paso Novillo, and from there it is a ten-hour walk with equipment to San Felipe. The alternative of £7 for a twenty-minute flight was easily chosen, despite the unorthodox approach to weighing the plane's payload—weigh equipment plus passengers, knock 150 kilograms off the total, and add another fare-payer or two to the trip.

Flying into the valley, we could see limestone cliffs on all sides. On arrival in San Felipe, it soon becomes apparent that the isolated location has preserved many aspects of an older lifestyle. The impression of a time warp is heightened on hearing the curious dialect of the local Chinantecs. For their part, the locals were intrigued by the appearance of the pale-skinned strangers in their village, but



they were very friendly and permission to go caving was soon arranged.

Several sites had looked interesting on the maps, but yielded little. High above the village, sinks were marked, but dense vegetation and temperatures over 100° F prevented their being investigated. A further factor was the discovery of significant caves down by the river.

Three separate groups visited the area, each flying in and walking out down the river. Around eight kilometers of cave was surveyed, the longest being Cueva Escalera, 4.5 kilometers. This proved to be a very interesting cave, as it contained what appeared to be a burial chamber about one kilometer from the entrance, although the jugs and pottery around the skeletons perhaps indicate that it could have been a refuge that later became a prison and finally a tomb. Following the expedition, Steve Milner did some research both in Mexico and in the United Kingdom to attempt to put these discoveries into perspective. He believes them to be Mixtec remains from about A.D. 1200-1400. If anyone would like more detailed information, his results and a photographic record are in the expedition report. The overall impression of everyone returning from Usila was that both the people and the area were a little bit special, even by Mexico standards.

A less courteous welcome was in store for the expedition leader shortly after the first Usila trip. Returning to follow up a lead from the recce, and carrying what he thought was a valid letter of permission to go caving, he began the exploration of black holes to the northeast of San José Tenango. In fact, it was only a case of one black hole before the arrival of the presidente's men, armed with machetes and pistols. The three cavers were marched several kilometers to the municipal building in Tenango and locked up for a few hours. They later found that part of the reason for this incarceration was Bob Cork; he is of larger than average stature, and the locals weren't convinced a pistol would stop him if he tried to escape, hence the locked room until some rifles were found. Eventually they were released and put on a bus to Huautla, but only after being severely admonished for their behavior. It was a chastened, but somewhat wiser, group that returned to Comalapa, and the story is related here to reinforce the lesson to be learned: Don't take anything for granted when it comes to caving in Mexico, especially when it comes to local versus regional or national permissions. This may be obvious to Mexico veterans, but I feel it is worth repeating to save anyone else having to go through a similar traumatic experience.

As a postscript to the above story, Tenango was visited again in 1989 by

Alan Box and the author. Despite permission letters from UNAM in Mexico City and INAH in Oaxaca and the blessing of the presidente, some people were still very suspicious and did not want us to be there. When this became clear, we beat a diplomatic retreat to avoid any unpleasantness. There remains much to do in this municipio, even excluding the vast potential of Cerro Rabón and Cerro Caballero, but it remains a tough nut to crack.

Only a few kilometers away from Tenango is San José Independencia, nestling between the misty mountains and the fertile plain. A huge man-made lake, Presa Miguel Alemán, provides a source of water, food, and work for the local people and a home for a host of exotic birds and other creatures. At the same time as the trials and tribulations of the Tenango team, three others were reaping the benefits of taking a boat ride across the lake. In Cerro Campana, they were taken to what was arguably the most impressive find of the whole expedition. Cueva Agua de Mano was a large, beautiful, and stunning streamway, stretching for three kilometers below the mountains. Long swims were interspersed with calcite ramps and gours. Occasional fossil remnants were passed, until finally a sump blocked the way on. This was free-dived to a short streamway and another sump not considered free-divable. Those of us who only saw the photos could all be observed with a green tinge for weeks afterwards.

The final area to be visited was that around Soledad Atzompa, to the south of Ciudad Mendoza. Not a common place name, you might think, but on arrival in the village, a multinational group of expedition members were told that they had come to the wrong place. There was another Soledad Atzompa less than ten kilometers away. After this false start, the team found some good cave, the largest being SOL 2, two kilometers long and two hundred meters deep.

With only a couple of weeks to the end of the expedition, we were still without a cave that could really be considered major. However, as is often the way with caving expeditions, our last discovery was to be the most significant in terms of length and depth statistics.

On virtually the last trip away from the Comalapa area, a group set off to probe the southern boundary of the Sierra Modelo. Between Rancho Nuevo and the Cosolapa-Tezonapa area, the base of the sierra remained unchecked. It was too big a question mark to leave so close to the main expedition area. In miserable weather, we attempted to trace water courses swollen by days of heavy rain, only to be rewarded with unenterable springs and a few minor caves. The locals told us of caves on the other side of the Río Tonto, and so it was that, more by luck than design, we crossed the Tonto and headed west into the lower part of the Coyolapa valley.

Immediately the atmosphere changed. A beautiful river flowed between limestone cliffs, and in the distance we could see the classic cone karst of the Huizmaloc-Ocotempa area worked by the GSAB. The whole area exuded the feel of caves. Upstream of Tepeyac, on the east bank of the river, our local guides stopped the truck at a point where the track was completely enclosed by thick undergrowth. They explained that in the wet season, a river often flowed across the road there. Hacking our way through the bushes, we were soon to find out why.

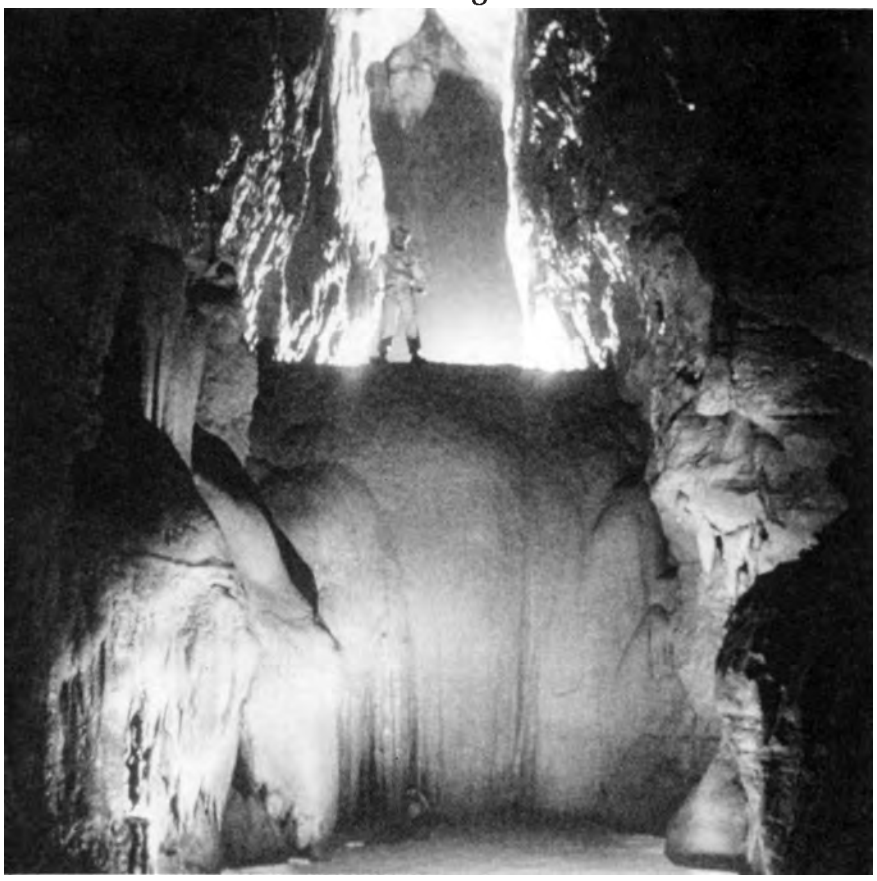
An entrance 4 meters wide by 3 meters high, completely invisible from the road, dropped down to a pool. Less than 30 meters from the truck, we were about to explore what many hours and miles of walking had failed to find. On another day we would have driven straight past it; such is the margin....

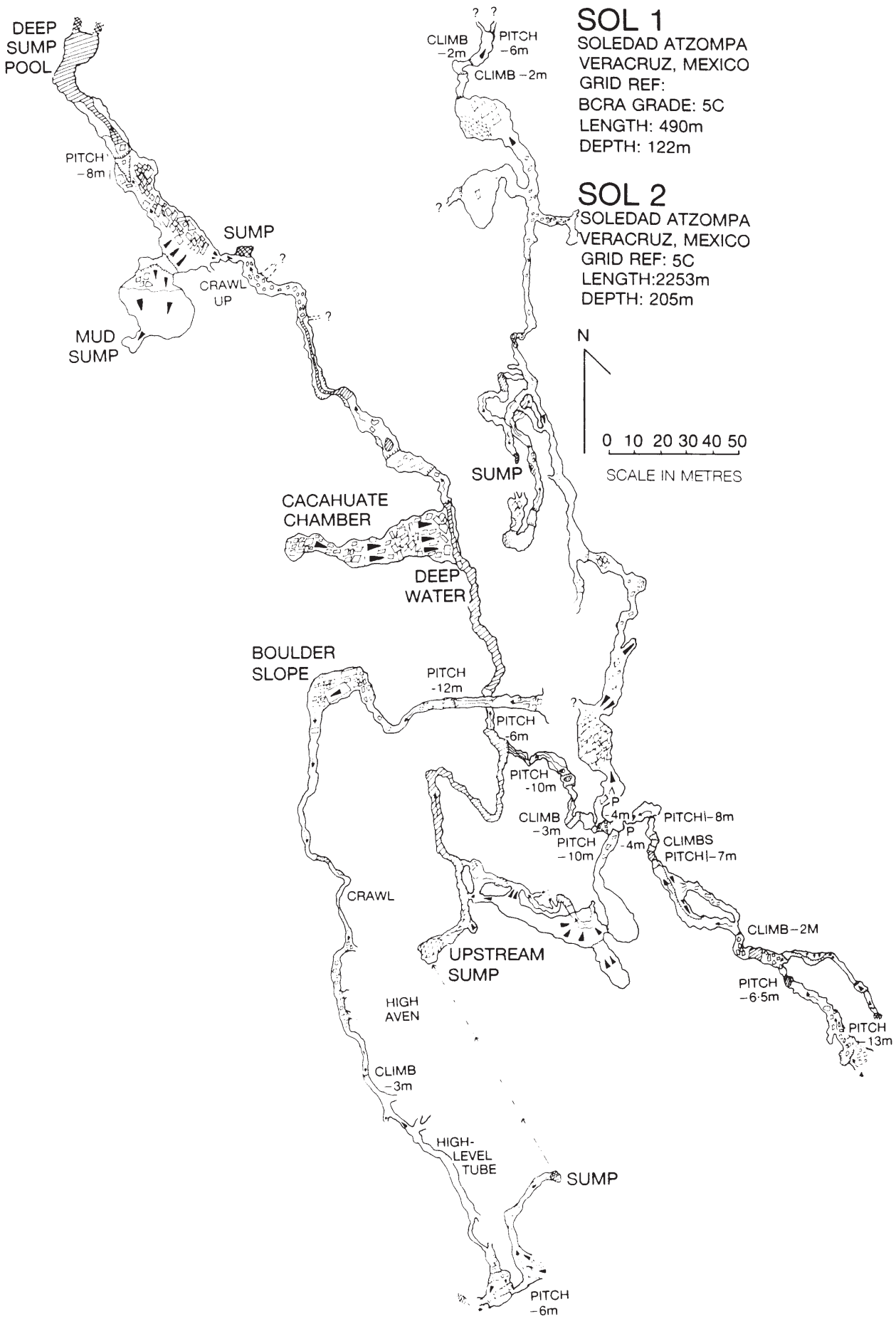
Beyond a short wade across the pool, an abandoned phreatic tunnel led away from the river and deep into the mountain. What was meant to be a first quick check became a scarcely-believable saunter into dreamland. Several hundred meters in, the tunnel broke into a superbly decorated chamber. Through a stal curtain, our "main passage" was suddenly reduced to a supporting role as it ran into a massive tunnel. With major leads in both directions, the first trip ended here.

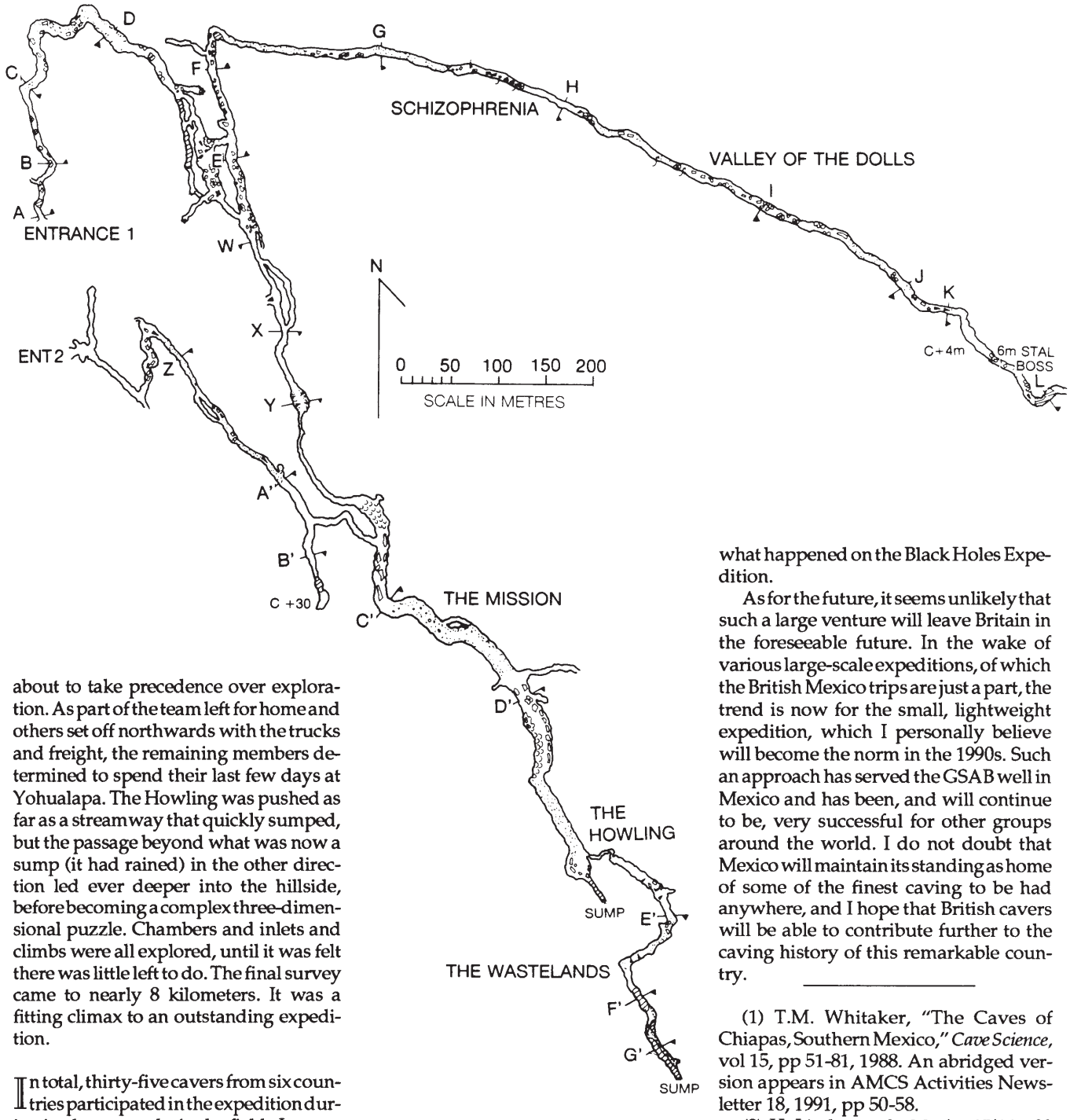
The next day, a team of six returned to Cueva Yohualapa, which continued to oblige us with full tape-length survey legs. Almost 4 kilometers was surveyed along the two main passages on that day alone. At one end, the passage closed to a tight slot that blew a gale, The Howling. The other limit was a 2-meter nearly sumped duck that was passed to another large gallery. None of the side passages had been entered, but already the cave was sure to be the major find of the expedition.

Unfortunately for some, including me, we were due back at base camp the next day, and return flights to Britain were

Cueva Agua de Mano. *Howard Limbert*




SOL 1
SOLEDAD ATZOMPA
VERACRUZ, MEXICO
GRID REF:
BCRA GRADE: 5C
LENGTH: 490m
DEPTH: 122m
SOL 2
SOLEDAD ATZOMPA
VERACRUZ, MEXICO
GRID REF: 5C
LENGTH:2253m
DEPTH: 205m
N
0 10 20 30 40 50
SCALE IN METRES
DEEP SUMP POOL
PITCH -8m
SUMP
CRAWL UP
MUD SUMP
CLIMB -2m
PITCH -6m
CLIMB -2m
SUMP
CACAHUATE CHAMBER
DEEP WATER
BOULDER SLOPE
PITCH -12m
PITCH -6m
PITCH -10m
CLIMB -3m
P -4m
PITCH -8m
PITCH -10m
P -4m
CLIMBS
PITCH -7m
CRAWL
UPSTREAM SUMP
CLIMB -2M
PITCH -6·5m
PITCH -13m
HIGH AVEN
CLIMB -3m
HIGH-LEVEL TUBE
SUMP
PITCH -6m



about to take precedence over exploration. As part of the team left for home and others set off northwards with the trucks and freight, the remaining members determined to spend their last few days at Yohualapa. The Howling was pushed as far as a streamway that quickly sumped, but the passage beyond what was now a sump (it had rained) in the other direction led ever deeper into the hillside, before becoming a complex three-dimensional puzzle. Chambers and inlets and climbs were all explored, until it was felt there was little left to do. The final survey came to nearly 8 kilometers. It was a fitting climax to an outstanding expedition.

In total, thirty-five cavers from six countries participated in the expedition during its three months in the field. It was a huge and costly undertaking, and tribute must be paid to Howard Limbert for masterminding the whole affair. That so many people were involved is not indicative of a desire to mount a big trip for the sake of it, but more a sign of the tremendous attraction of caving in Mexico. The fact that it all worked so well is largely due to the commitment of the group as a whole and the tremendous team spirit that existed throughout.

To sum up the results, we did not find the one-thousand-meter-deep cave many secretly hoped for, nor did we find a mega-system to rank with the longest in Mexico. But we did find many, many superb caves, the memories of which will live with us for much longer than any statistic. Additionally, each has his or her own story about Mexico, a wonderful country. For those who are interested in more details, a full report has been published (*5*). For the rest, I hope this piece might convey some of the essence of what happened on the Black Holes Expedition.

As for the future, it seems unlikely that such a large venture will leave Britain in the foreseeable future. In the wake of various large-scale expeditions, of which the British Mexico trips are just a part, the trend is now for the small, lightweight expedition, which I personally believe will become the norm in the 1990s. Such an approach has served the GSAB well in Mexico and has been, and will continue to be, very successful for other groups around the world. I do not doubt that Mexico will maintain its standing as home of some of the finest caving to be had anywhere, and I hope that British cavers will be able to contribute further to the caving history of this remarkable country.

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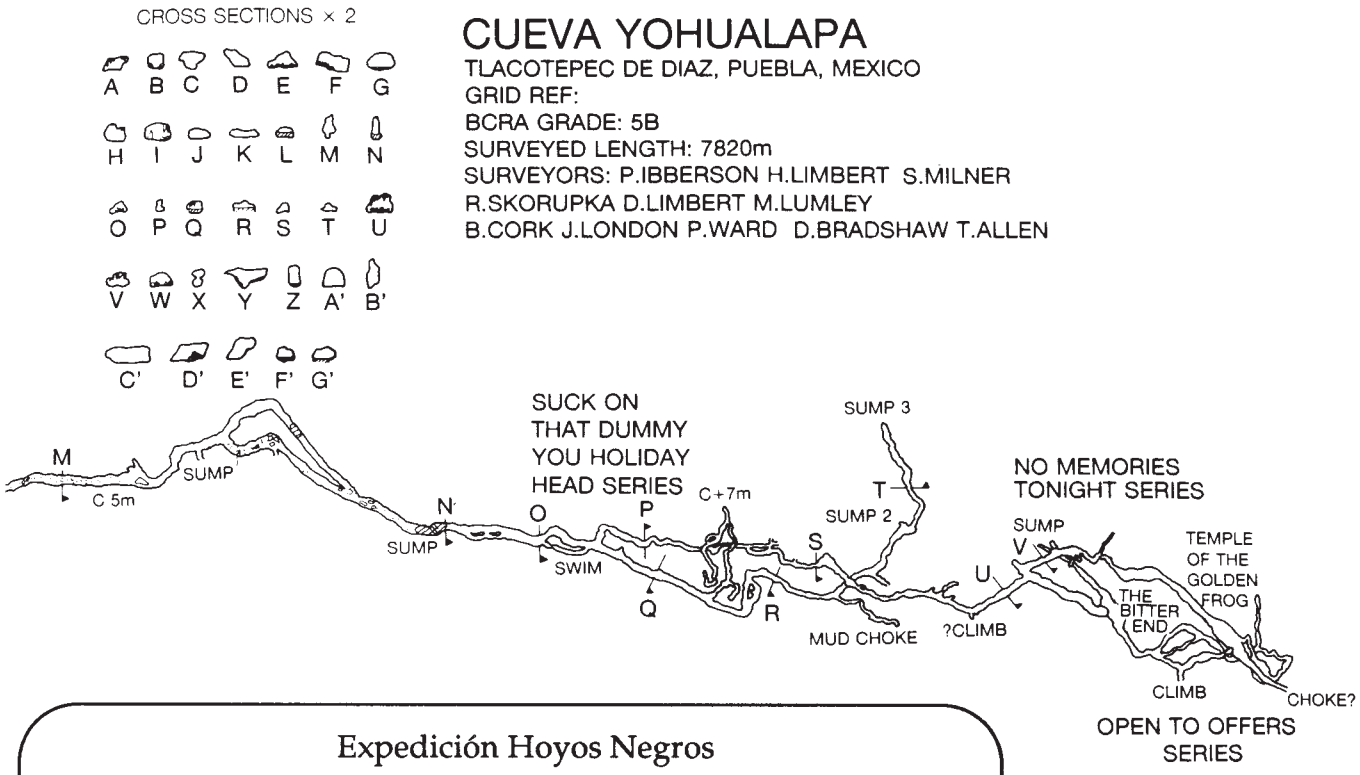
(1) T.M. Whitaker, "The Caves of Chiapas, Southern Mexico," *Cave Science*, vol 15, pp 51-81, 1988. An abridged version appears in AMCS Activities Newsletter 18, 1991, pp 50-58.

(2) H. Limbert, ed., *Mexico 85/86*, 122 pp, 1986 (expedition report)

(3) P. Ackermann and G. Rouillon, "Zongolica: 1980-81 French Expedition," *AMCS Activities Newsletter* 12, 1982, pp 59-70.

(4) J-C London and P. Meus, eds., *Expé Sous Sierra*, 66 pp, 1989 (expedition report).

(5) M. Lumley, D. Bradshaw, S. Milner, eds., *Mexico, the Black Holes Expedition*, 37 pp, [1991] (expedition report). The maps here are reprinted from this report.



Expedición Hoyos Negros

En el año de 1988 un grupo expedicionario Inglés visitó la Sierra de Modelo al sureste de Zongolica, Veracruz. Su campamento fue situada en la población de Comalapa. Encontrando bastantes sótanos los cuales descendieron, incluyendo el Sótano de Eladio Martínez, con una profundidad de 220 metros, y el Sótano de los Hermanos Peligrosos, un tiro que alcanzó una profundidad total de 391 metros de una manero escalonada, sin embargo ninguno de estos tiros conectó a un sistema. Por lo cual se empezó a explorar con más atención las cavernas horizontales y de las cuales se destacaron las siguientes: Sumidero de Xocjiotepec, 2.2 kilómetros, Nacimiento de Siete Aguas, 1.5 kilómetros, Cueva Escalero del valle de Usila, 4.5 kilómetros, SOL 2 en Soledad Atzompa, 2 kilómetros, y por último Cueva Yohualapa en el estado de Pueblo con casi 8 kilómetros.

Nacimiento de Siete Aguas. *Paul Ibberson*

POISONOUS TREES AND THE PASO REAL PIT

John J. Pint

Paso Real (Regal Pass) is a rustic pueblo located fairly near the town of Purificación, Jalisco. It is collection of maybe fifty houses with dirt floors and glassless windows, where you find horses instead of cars (definitely not a one-horse town), but not a sign of sidewalks, cinemas, or electricity. Beyond Paso Real lies a range of limestone peaks 17 kilometers long and 500 to 900 meters high that to our knowledge has never before been visited by cavers. Local people assured us that there were humongous pits on top of these *cerros*, and horizontal caves "decorated like a church." So, in October of 1990, ZOTZ members John and Susy Pint, Claudio Chilomer, and Juan Blake decided to brave the 90° F heat and 100 percent humidity and hack their way through pathless jungle up to the top. Actually, it was mainly Don Ginio, our wiry little flip-flop clad, 56-year-old guide doing the hacking, and the rest of us trying to keep up with him.

Huffing and puffing, we finally reached the edge of one of the prettiest pits we've ever come across. While the entrances and walls of many sótanos are overgrown with vegetation, this one presents a clean, multi-hued face that the eye can follow straight down to the bottom, 51 meters below, where one could clearly distinguish empty space on all sides, suggesting that it might be a skylight entrance to a large room or passage. About three-fourths of the way down, we could see what looked like two large, bright-yellow egg yolks resting on a slightly recessed shelf. A better look with binoculars revealed that these are open-air stalagmites, still growing. At the edge of this pit grow several *hinchahuevo* trees. The bark is poisonous and famed for causing skin irritation in any sensitive part of the body that comes into contact with it. This does not quite explain the name *hinchahuevo* (swells your balls), since it is unlikely that anyone but Tarzan would come into such intimate contact with a tree branch. Be that as it may, Don Ginio suggested we spit at any tree we should accidentally touch, to avoid getting the rash. I dispute the efficacy of this remedy, as all of us ended up with light to horrible cases of the swollen-ball itch. Later we learned that a mixture of lemon juice and *atole*, from tortilla flour, does stop the progress of this worse-than-poison-ivy rash.

We explored El Sótano de Paso Real on two subsequent visits. The rope needs padding only at the lip of the pit, the rest of the distance being free. As you descend, you admire the colorful walls, occasionally decorated by flowstone, and, of course, the egg yolks, which look a whole lot bigger when you're next to them. The pit widens as you drop, finally belling out into a large room about 20 meters in diameter. The spongy floor is a mixture of bat guano and soil washed in from above, upon which two stalagmites are growing, one of them fed by a constant drip from far above.

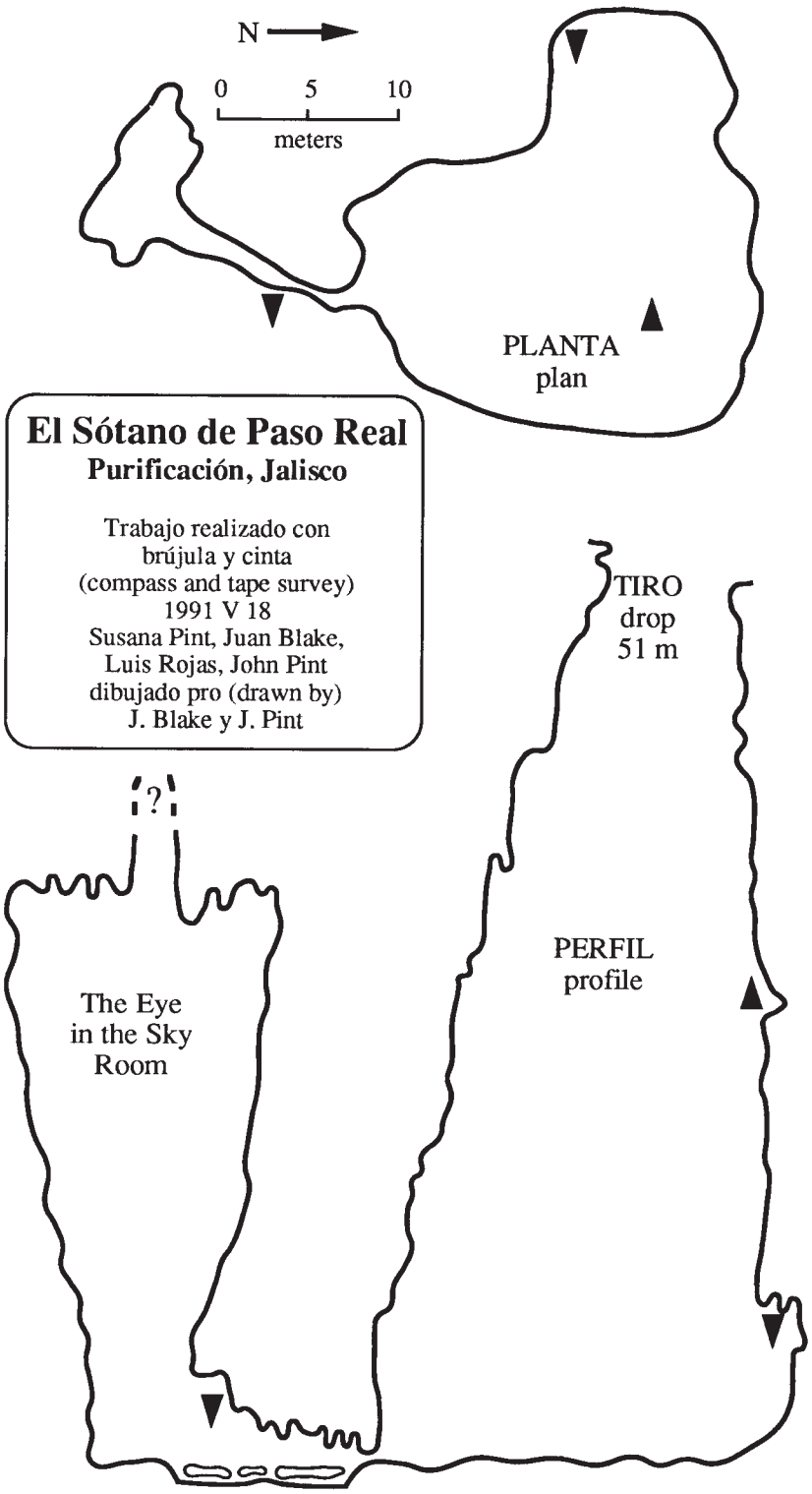
On one wall of the room there's a spectacular, sparkling flowstone cascade, and on the other side a low, narrow crevice leads to a smaller, second room with a very high ceiling. This room also has nice decorations, plenty of bats, including three small groups of vampires, and two large holes on opposite sides of the room, maybe 25 meters above the floor.

On May 18, 1991, we surveyed the pit, and Luis Rojas managed to climb the crumbly wall to the lower edge of one of the mysterious holes. Alas, this and the hole across the room both turned out to be shallow indentations.

Although Paso Real Pit is not the entrance to a system, its features suggest that the Purificación limestone range may have much to offer in the future, if we can just avoid the swollen-ball trees.

Sótano de Paso Real

Espeleólogos del grupo ZOTZ visitaron una nueva area calcárea en las cercanías de Purificación, Jalisco, mapeando así el Sótano de Paso Real con una profundidad de 51 metros. Dicho tiro contiene un escurrimiento sobre una de las paredes y un salón en un pasaje secondario, el cual contiene varias formaciones y murciélagos, incluyendo vampiros.


N
0 5 10
meters
PLANTA
plan
El Sótano de Paso Real
Purificación, Jalisco
Trabajo realizado con
brújula y cinta
(compass and tape survey)
1991 V 18
Susana Pint, Juan Blake,
Luis Rojas, John Pint
dibujado pro (drawn by)
J. Blake y J. Pint
TIRO
drop
51 m
?
The Eye
in the Sky
Room
PERFIL
profile

Rolf Adams 1965–1992

On Sunday afternoon, April 19,1992, Australian cave explorer Rolf Adams died in Hole in the Wall spring near Marianna, Florida, in a cave-diving accident. Adams was one of the world's leading deep-cave explorers. He had come to the United States at the end of February to join an international team that was training for the 1993 San Agustín Expedition to Huautla, Oaxaca, Mexico. The team had successfully completed two months of cave-diving training at hyperbaric research facilities and at Jackson Blue Spring, using computer-controlled rebreathers, and was in the process of packing up when Adams and team-mate Jim Smith decided to tour one of the many nearby springs prior to Adams's departure for Australia that afternoon, using standard open-circuit cave-diving apparatus. They were returning to the entrance from a 365-meter penetration into the cave when Adams developed difficulty breathing at a depth of 30 meters. Despite a heroic effort by Smith to assist, Adams passed out and drowned within 60 meters of the entrance. Medical studies later indicated that he had suffered an arterial gas embolism.

Adams was best known to cave-exploration teams around the world for his pioneering work in the deep caves of Oaxaca, Mexico, although his capabilities were also well known in European circles, in his native Australia, and in New Zealand. Rolf gained fame in 1987 in the Chilchotla highlands of Oaxaca as a protegé of Australia's premier vertical caver, Alan Warild. He was quickly recognized as an outstanding team player and began working with the American team exploring Cueva Cheve. He became a prime force in establishing it as the deepest cavern in the Western Hemisphere. In the spring of 1989, Rolf was the catalyst behind many breakthroughs in the Cheve system. On a three-day blitz from Camp II, he and Jim Smith pioneered the intricate path leading out of the Hall of the Restless Giants that was the crucial route that opened up the vast discoveries to follow. A week later, he led Bob Benedict and me back through this section to where we ultimately discovered the Black Borehole and what was then the deepest point in Cheve, at -1125 meters. Rolf was also the driving force behind a 40-hour marathon push that successfully linked the 887-meter-deep

Photo by Bill Stone

Osto de Puente Natural to Cueva Cheve, a feat that added significantly to the overall depth and length of the system. I am quite certain that everyone involved in that trip, both from the Puente and Cheve sides, has clear memories of Rolf's cheerful character even when the going was grim. On a return expedition, in the spring of 1990, Rolf was a member of the team that first established Camp III at -1050 meters and explored and surveyed Cheve to a depth of -1364, establishing it as the world's sixth-deepest cave. He was also one of only three people to have made a day-trip to Camp III in Cheve, a thirty-hour, twenty-kilometer round trip to 1050 meters below the Cheve entrance.

A Yosemite-class 5.11 rock climber, kayaker, and long-distance runner, Rolf was to have participated in the annual 24-hour "Rogaining" overland running event held in New South Wales, Australia, following his return from the training mission in Florida.

Rolf earned his masters degree in applied mathematics at the University of California at Berkeley in 1989 and was to begin work on his PhD in Belgium following the return of the San Agustín Expedition. He was a brilliant computer scientist and had recently completed a one-year sabbatical developing computer-vision protocols at the CSIRO Applied Mathematics Branch of Australia's National Research Laboratories in Sydney.

During March and April of this year, Rolf was in top form. He acquired the highest level of cave-diving certification and then went on to learn about experimental rebreathers. He amazed everyone with his ability to grasp complex new tasks and then put them into practice. After discovering during a dive a problem with one of the electronic display systems on the rebreather, he calmly sat down one afternoon in a hammock at base camp with a printout of the sixteen thousand lines of code that ran on the on-board computer. That evening he took aside the engineer who had written the code and politely pointed out the problem. By the time the training exercises were over, Rolf had the ability to confidently carry out a four-hour rebreather cave-dive, swimming a total distance of nearly four kilometers under water in the process. And he could do that every day, or, as he often did, simply serve as the safety diver for another member of the team, using traditional Scuba. He was equally at ease under water with whatever apparatus was needed. That Rolf should be taken from us while on a tourist dive following this complex work seems terribly unfair. But such cruel irony is common in our world. It is much like the crack Himalayan climbing team that is returning from its most dangerous expedition without a scratch, only to lose one of its best members while bouldering on the hike back to civilization.

Theodore Roosevelt, one of America'a most charismatic presidents, once said, "Far better to dare mighty things than to take rank with those who live in the gray twilight that knows not victory nor defeat." Rolf embodies that credo, and in his brief time on our planet he lived a richer life than all but a very few will ever know. And he left our world, and all he touched, a great deal richer in spirit. Although he was only twenty-six years old, he was one of the finest individuals I have ever known.

If there were to be an epitaph for Rolf, it should read: "He was a quick study, a jack of all trades, and good at every one of them. He was the ultimate modern explorer, bright, athletic, a team player you could count on when the chips were down. He was never at a loss for a smile or a good joke, and he always carried more than his fair share." We, your fellow explorers, salute you. Godspeed, Rolf Adams. —*Bill Stone*

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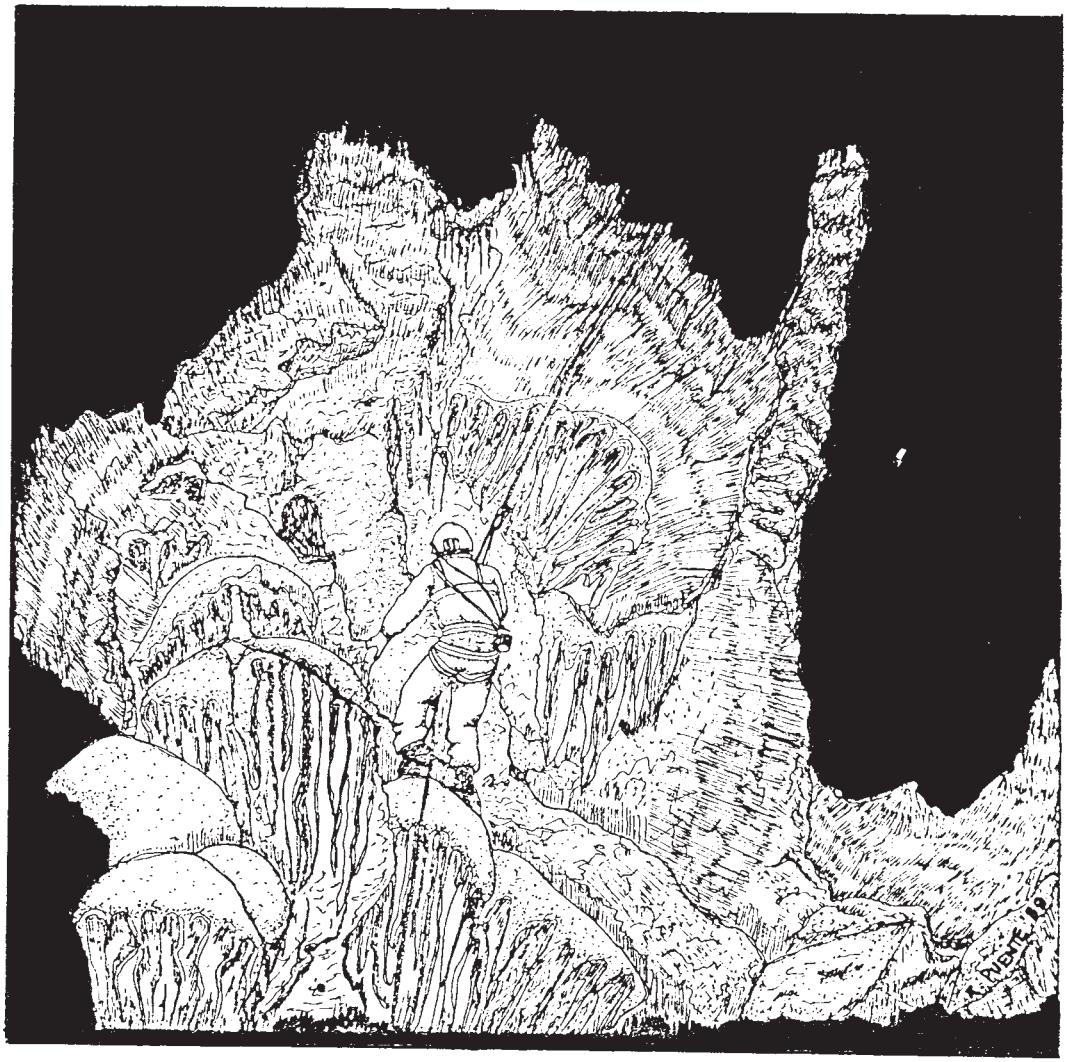

Drawing by Raul Puente Martinez