

A CHECKLIST OF THE CAVE FAUNA OF MEXICO. VI. VALLE DE LOS FANTASMAS REGION, SAN LUIS POTOSÍ¹

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This is the first report concerning the cave dwelling fauna of one of the highest altitude karst areas in México. The Valle de los Fantasmas Region lies in the western part of the Sierra Madre Oriental, specifically, in the Sierra de Álvarez which divides the Llanura de Río Verde from the Valle de San Luis Potosí. The region, as defined in this report, lies wholly within the Municipio de Zaragoza and is about 17 km wide and 28 km long (see map, Fig. 1). The largest village in the region is San Francisco, which may be reached by Highway 86 from Ciudad Valles, 227 km to the east, or San Luis Potosí, 38 km to the west. Elevations range from about 2600 m to 2900 m above sea level.

Floristically, the area may be characterized according to the scheme of Rzedowski (1965). Most of the region is "Encinar arbustivo" (oak scrub), a very open woodland with expanses of savannah and occasional clusters of *Opuntia* and *Agave*. About 15 km south of San Francisco the vegetation abruptly changes to juniper and, on the higher peaks nearby, pine. This is presumably related to the presence of volcanic soils (Rzedowski, 1965). The climate is temperate (the mean annual temperature is probably 15°-16°C) and semi-humid (an estimated 1000 mm of rainfall yearly).

Geologically, the area is complex and has not been adequately studied. The Cretaceous limestone has been intensely folded and ranges from massive to thin bedded from east to west. Metamorphosis is apparent, especially in the southern and western areas. Red

Earth is common in many areas (good examples may be seen along Highway 86 between Valle de los Fantasmas and Puerto Altamira). Karst development is more advanced on the eastern side of the area. Massive karren, lapies, and karst pinnacles have developed near San Francisco and in the Valle de los Fantasmas immediately to the west. Presumably, the building-size karst pinnacles in the Valle de los Fantasmas are the source of the name Fantasmas (phantoms), as they appear rather ghostly in the frequent fogs encountered at these elevations. The development of sótanos is often controlled, especially in the western areas, by steeply dipping or vertical beds. Igneous activity has further complicated the geology, especially to the south in the vicinity of Cueva de la Puente. This system drains a 1 km diameter dolina which is actually a valley flanked by volcanic ridges and blocked at the south end by an igneous bridge (La Puente). The actual extent of the karst is not presently known, but uninvestigated karst terrain may be seen to the north from Puerto Altamira. The area south of Cueva de la Virgen has not been investigated.

The area was first visited by AMCS members in August 1966. John Fish, David McKenzie, James Reddell, and Richard M. Smith explored seven small pits ranging from 10 to 43 m deep. Cueva de Aguacate and Cueva de Carnicerías were also visited and a few collections made. Fish entered the impressive Sótano de San Francisco but was unable to reach the bottom because the rope was not long enough (Fish and Reddell, 1966). The area was again visited in November 1966 by Jonathan Davis, John Fish, Charlie Jennings, Charlie and Susie Loving, and Mac Mc-

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Laughlin (Fish, 1966). This time Fish reached the bottom of Sótano de San Francisco, but found only water and no place to get off. Biological collections were made from several unspecified pits in the immediate area, and from Sótano de Carlos. *Mexisphodrus* beetles and the first specimens of *Mexaphaenops fishi* Barr, a troglobite carabid beetle, were collected on this trip. As interest in the area grew, nine more expeditions involving forty persons were made to the region in the years 1969, 1971, and 1972. To date, fifty caves and pits have been reported. Forty-eight of these have been explored, eighteen have been mapped, and twenty-one have been studied biologically. Sixteen of the caves and pits have no names and at least seven (most in the immediate San Francisco area) have not been accurately located on a map. Brief descriptions of the caves that have been studied biologically and other important caves are given below. Maps and descriptions of many of these caves are given by Walsh (1972).

Sótano de Abernathy—This small pit (22 m drop) is located in the "Los Sótanos Unidos" area, about 2 km west of San Francisco. A hole 6 m above the floor leads into a parallel dome-pit, the bottom of which is 38 m below the surface. The pit was mapped in January 1969 by Miles Abernathy, William Elliott, and David Honea.

Cueva del Agua—Located about 14 km SSE of San Francisco in the Cañon de Chivos, this cave ends in a siphon and mud fill after 120 m. The cave was mapped in March 1969 by Jimmy Jarl and Brian Peterson, but no biological collections were made.

Sótano de las Arañas—This pit is located in the Los Sótanos Unidos area and is developed along strongly folded bedding planes. The beds dip 65° at the entrance and steepen to 90° farther down. The entrance is 3 m in diameter and drops 46 m to a talus slope, which ends at the 61 m level. Numerous Recent mammal bones were observed in the cave. The cave was mapped in November 1968 by Joe Cepeda and Russell Harmon.

Cueva de los Caballos—This cave is about 400 m NW of Sótano de las Arañas, near the bottom of a small valley. The 6 m high, 9 m wide entrance leads into a 13 m x 15 m room formed under vertically dipping beds. About 30 m of low passage leads from the east end of the room in the dark zone, where the air temperature was 17°C. The entrance room is sometimes used as a horse corral. The cave was mapped in January 1969 by Joe Cepeda and Russell Harmon.

Sótano de Carlos—This pit is about 2 km N of San Francisco on the other side of a pass. The 2 m diam-

eter entrance is under a boulder and drops 88 m to a room 8 m wide and 23 m long. The total depth is 99 m. The cave was mapped in November 1968 by Russell Harmon and David Honea.

Cueva de Carnicerías—This cave was visited in 1966 and is located in the karst valley containing the village of San Francisco. The cave is a single room formed by collapse and is about 15 m in diameter and 9 m deep.

Cueva de Cinquenta y Ocho—This 105 m long cave lies 1 km W of the village of Cinquenta y Ocho near the top, and on the south side of an east-west valley. The cave is about 3 m wide and 5 m high for most of its length. The air temperature was 14.5°C at the end of the cave. The cave was mapped in May 1972 by William Elliott, Pam Lynn, and Ron Ralph.

Cueva de Entrada Chica—This cave is a 35 m deep vertical pit with a 0.5 m in diameter entrance. It is located in Valle de los Fantasma and was visited in 1966.

Sumidero de Fantasma—This large sink, located north of the highway in Valle de los Fantasma, was visited in 1966. It is a vertical shaft 6 m wide, 10 m long, and 30 m deep. It receives the flood waters of a long flat draw. There is no horizontal extent and the floor is of deep mud.

Sótano de la Golondrina—This pit is about 500 m west of Highway 86 at the "Agua" sign, which is 800 m north of the cobblestone road leading to the Los Sótanos Unidos area. The 3 m diameter entrance drops 18 m to the top of a muddy talus slope. The room at the bottom of the slope is 15 m wide and 12 m high. The total depth is 38 m. A 10 m long side passage at the 18 m level contains many arthropods. The pit was mapped in November 1968 by Martha Burk, Sharon Cathey, William Elliott, and Jimmy Jarl.

Cueva de la Iglesia—This cave is located 1.6 km west of San Francisco in the Valle de los Fantasma. The 15 m wide, 4 m high entrance slopes down to a single room which is 30 m wide, 40 m long and 14 m high. The total depth is 14 m. The cave was mapped in November 1968 by Keith Heuss, Jimmy Jarl, Jim McIntire, Brian Peterson, and Joe Sumbera, but no biological collections were made.

Cueva de la Laguna—This cave is located on the west side of a stock tank, about 5 km north of Highway 86 in the Valle de los Fantasma. It may be reached by a dirt road. The 6 m wide, 2 to 3 m high entrance leads into a 12 m long, 5 to 6 m wide room, then under a natural bridge into a 9 m square room. The passage continues for 9 m to a crawlway which goes up to the left for 5 or 6 m. The cave was mapped in May 1972 by William Elliott and Mike

McEachern, and is about 34 m long. The air temperature was 17°C.

Cueva de las Moscas—This 12 m long cave was visited in 1968. It is located at the base of a cliff about 2 km south of San Francisco and about 150 m northwest of the dirt road to La Puente.

Sótano de Nopales—This pit lies about 1 km southwest of the village of Cinquenta y Ocho near the top of a ridge. The 14 m long, 4 m wide entrance drops 26 m to a 40 m long sloping room. The pit was mapped in November 1968 by Duane Faith and Jimmy Jarl.

Sótano de Ojo de Agua—This deep pit is located approximately 8 or 9 km ESE of San Francisco in the Sierra de los Arboles. A two hour hike over confusing, obscure trails is required to reach it. The 8 m diameter entrance drops 71 m to the top of a talus slope. Short drops of 2, 3, 2, and 5 m lead to the lowest level at 97 m. A 35 m long, muddy passage doubles back under the entrance at the 93 m level. The mud temperature in this passage was 13.5°C. The pit was mapped in November 1968 by William Elliott and Jimmy Jarl.

Sótano del Pájaro—This pit is located in the Los Sótanos Unidos area. It has two entrances, 2 m and 0.5 m in diameter, which connect at the 5 m level. The larger entrance drops 27 m into a 2 m wide, 10 m long fissure. At the south end of the fissure there is a 6 m drop to a ledge, then a 25 m drop to the main room of the cave. This room is about 9 m in diameter. A 20 m long, 5 m wide, 8 m high passage strikes northeast and ends abruptly. This passage is formed in 70° dipping beds. The lowest point is in the main room (61 m). The bottom of the final drop is littered with many bones (*Peromyscus*, weasel, skunk, deer, pig, goat, and horse). The pit was mapped in January 1969 by William Elliott and David Honea.

Cueva de la Puente—This large cave is located in the Dolina de la Puente about 17 km SSE of San Francisco. The cave is formed in metamorphosed limestone. It is not uncommon to see cobbles of serpentine, rhyolite, and limestone together on the cave floor, as well as red and yellow streaks in the cave walls. The cave has two entrances. The main arroyo entrance is 24 m wide and 8 m high and accepts most of the run-off from the volcanic ridges that flank the dolina. The 6 m diameter upper entrance is located 100 m inside the main entrance but does not appear to take any run-off. The 5 m high, 12 m wide passage continues until a 1 m high crawlway is encountered 240 m inside the main entrance. After 100 m the passage opens up to 12 m wide and 2 to 5 m high. This continues for 180 m, at which point a small stream enters from a fissure on the right. This high,

narrow fissure has been explored for about 300 m to where it ends in a breakdown room. The main passage continues at the same width and with ceiling heights up to 15 m for 800 m to the Big Room, which is 60 m long, 24 m wide, and 25 to 30 m high. A large stream passage enters from the left. This may be followed over cascades and through small lakes for about 300 m upstream, and roughly southeast, to where the water spurts out of a small hole in the wall. At the Big Room the two streams merge and continue another 240 m to a siphon. The cave meanders from northeast to northwest and strikes north. The terminal siphon lies close to a large, sawdust filled dolina near a junction of the La Puente road, 0.5 km north of the Dolina de la Puente. Terraced sandbanks, large cobbles, and large logs attest to the violent flooding which the cave must undergo at times. As a result, most of the cave fauna is washed in. According to the local inhabitants, the cave has two resurgences, Cueva de la Virgen and Cueva de Salida del Agua de la Puente, which will be discussed below. The air temperature in the cave was 21° to 21.5°C, and the water temperature was 18°-19°C. The cave is considerably warmer than other caves in the region and this might be explained by the close proximity of volcanic rock. The cave was mapped in March 1969 by Logan McNatt, Brian Peterson, Joe Sumbera, Mike Walsh, and Gail Webster. About 2400 m of passage have been explored and 2066 m mapped, making this the largest cave in the Valle de los Fantasmas Region.

Sótano de Puerto de los Lobos—This impressive pit is located 2.7 km south of San Francisco on the southern slope of the Sierra de los Arboles. The full name is Sótano Hondo de la Sierra de los Arboles de Puerto de los Lobos. The 10 m diameter entrance is obscured by a thicket of oaks. It does not appear to take surface run-off. The entrance drops 179 m to the top of a steep talus slope. At the bottom of the slope is a 5.5 m drop to a mud slope which ends after 30 m at the low point, 198 m below the entrance. It is possible to rig the pit to obtain a 189 m free drop. At the top of the talus slope is an 8 m x 12 m, 15 m high room, the floor of which is covered with 15 cm of water. A small seep trickles out of the wall and the water flows out of the room and sinks in the talus. At the time of its discovery, the pit was the third deepest drop in México. It was mapped in September 1968 by William Elliott, Duane Faith, Jim McIntire, and Joe Sumbera.

Cueva de Salida del Agua de la Puente—This cave is located in the Cañon de Chivos, 14 km SSE of San Francisco, and about 2.6 km northeast of the terminal siphon in Cueva de la Puente. It is rumored to be

a wet weather resurgence for Cueva de la Puente. Large trees have been reported to wash out of the cave during heavy rains. The cave is a large passage which ends after 122 m in a mud and water siphon. The cave was mapped in March 1969 by Brian Peterson and Jimmy Jarl, but no biological collections were made.

"Cave at San Francisco"—This cave was visited in 1966 but it was not mapped and its exact location is unknown.

Sótano de San Francisco—This impressive pit is located in the village of San Francisco. The steep-sided arroyo leading to the cave carries a small, swift stream during the rainy season. The 3 x 4.5 m entrance drops 102 m to a 21 m long, 4.5 m wide pool full of human fecal matter. A 2 m drop is then encountered, and then a 12 m long pool after 7 m of dry ground. At the end of the second pool is an unentered pit, estimated to be between 170 and 245 m deep. This pit could lead to an extensive system. The cave was first entered by John Fish in August 1966 and again in November 1966 at which time he drew a sketch map (Fish, 1966). The pit was mapped to the top of the second drop in May 1972 by Mike McEachern and Ron Ralph. The water temperature was 14.5°-15°C.

Sótano de San Francisco n. 2—This pit is located 1 km south of San Francisco in a 12 m diameter dolina. The pit follows a vertical bedding plane down to a water filled passage, 43 m below the surface. This passage goes 7 m, turns left, goes another 11 m, and ends in a 5 m long, muddy room. The water temperature was 12°C. The cave was partially mapped in January 1969 by William Elliott and David Honea. The map was completed in May 1972 by William Elliott and Mike McEachern.

Cueva de Sierra Blanca—This cave is located 10.5 km south of San Francisco, about 1 km up a canyon from the La Puente road. The 10 m wide, 5 m high entrance leads into a 24 m long, 10 m wide room, then another room of the same dimensions. Two walking passages extend from the second room, one for 46 m to a breakdown choke, the other to a 3 m diameter room and then to a smaller entrance. The cave was visited in September 1968 but was not mapped nor investigated biologically.

Sótano de Super-Macho—This small, 14 m blind pit was visited in January 1969. It is located in the Los Sótanos Unidos area.

"Small cave at Valle de los Fantasma"—This cave was visited in 1966, but its exact location is unknown.

"Sink at Valle de los Fantasma"—This was visited in 1966, but its exact location is unknown.

"Sótano at Valle de los Fantasma"—This pit was visited in 1966, but its exact location is unknown.

Cueva de la Virgen—This cave is located 2.5 km southeast of Cueva de la Puente. It is reported by the local people to flow during wet weather. Presumably, it is a resurgence for Cueva de la Puente. Past the 24 m high, 6 m wide entrance, the passage slopes upward for about 61 m to a water filled passage which retains the passage dimensions of 24 m in height and 12 m in width. The cave has not been mapped nor studied biologically. It was explored in November 1968 by Duane Faith, Jim McIntire, Bill Ramsel, and Joe Sumbera.

This report is not a complete summary of the taxa that have been collected in this region. Several new species await description, particularly among the millipedes, spiders, and crickets. Terrestrial isopods have been collected in Cueva de la Puente and Cueva de la Laguna and are being studied by Dr. George A. Schultz.

It is most interesting to note that of the 98 species listed in this report (93 of them invertebrates), only two may be considered troglobites (one millipede and one carabid beetle). This contrasts sharply with the nature of the cave fauna of the Sierra de Guatemala, which has a rather high number and percentage of cave-adapted forms (about 18% of the invertebrates) (Mitchell, 1969; Reddell and Mitchell, 1971; Reddell and Elliott, 1973a). The troglobite fauna of the Valle de los Fantasma region (about 2% of the invertebrates) also contrasts strongly with that of the Sierra de El Abra (about 9% of the invertebrates) (Reddell and Mitchell, 1971a; Reddell and Elliott, 1973), a lowland, semi-tropical area where one would expect the lowest number and percentage of cave adapted species, according to Mitchell's hypothesis (1969). In addition, there are no aquatic troglobites in the Valle de los Fantasma region, whereas aquatic species make up 50% and 27% of the invertebrate troglobites in the Sierra de El Abra and Sierra de Guatemala, respectively. Furthermore, the cave fauna of the Valle de los Fantasma region appears to have few affinities with those of the other two regions, and perhaps has had a much different history of colonization. Although little is known of the relative ages of cave systems in these three areas, we find it tempting to speculate that climatic changes in such a high altitude area as Valle de los Fantasma may have been much more drastic than in the two lower areas we are comparing, especially during the Pleistocene. Severe changes may have served not only to wipe out epigean forms but incipient cave forms as well.

The cave names given in the following checklist are those accepted as standard by the Association for

Mexican Cave Studies. Troglóbites are indicated by an asterisk.

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We wish to thank the following systematists for their identification of the taxa included in this report: R.K. Allen, mayflies; D.M. Anderson, beetles; T.C. Barr, Jr., beetles; A. Brindle, earwigs; G.W. Byers, crane flies; R.W. Carlson, ichneumonid wasps; O.L. Cartwright, beetles; N.B. Causey, millipedes; K.C. Christiansen, collembolans; D.R. Davis, moths; O.S. Flint, caddis flies, damselflies, and dragonflies; R.C. Froeschner, hemipterans; R.J. Gagné, flies; G.E. Gates, earthworms; W.J. Gertsch, spiders; C.J. and M.L. Goodnight, harvestmen; A.B. Gurney, earwigs; L.H. Herman, beetles; H.F. Howden, beetles; T.H. Hubbell, crickets; L.V. Knutson, flies; J.D. Lynch, frogs; T.R. Mollhagen, bats; W.B. Muchmore, pseudoscorpions; R. Newcomer, salamanders; D.R. Smith, ants; P.J. Spangler, beetles; T.J. Spilman, beetles; G.C. Steyskal, flies; S. Szerlip, hemipterans; R.E. White, beetles; W.W. Wirth, flies.

PHYLUM ANNELIDA

CLASS CLITELLATA

Order Oligochaeta

Family Lumbricidae

Dendrobaena rubida (Savigny) (det. G.E. Gates)

Records—Cueva de la Puente.

Bibliography—Gates, 1973a.

Comment—This species is probably of European origin.

Octolasion tyrtaeum (Savigny) (det. G.E. Gates)

Records—Sótano de la Golondrina, Sótano de Nopales, and Sótano de Ojo de Agua.

Bibliography—Gates, 1971; 1973; 1973a.

Comment—This species is probably of European origin.

PHYLUM ARTHORPODA

CLASS ARACHNIDA

Order Scorpionida

Family Vejovidae

Vejovis sp. nr. *granulatus* Pocock (det. W.J. Gertsch)

Records—Sótano de Carlos.

Comment—This probably represents an undescribed species.

Order Chelonethida

Family Cheliferidae

Mexichelifer reddelli Muchmore

Records—Cueva de Carnicerías.

Bibliography—Muchmore, 1973.

Family Chernetidae

Undetermined genus and species

Records—Cueva de Cinquenta y Ocho.

Comment—A single protonymph was collected in the dark zone.

Order Araneae

Suborder Mygalomorphae

Family Barychelidae

Zygopelma sp. (det. W.J. Gertsch)

Records—Sótano de Puerto de los Lobos.

Comment—This apparently represents an undescribed species.

Family Theraphosidae

Schizopelma elliotti Gertsch

Records—Cueva de la Laguna.

Bibliography—Gertsch, 1973.

Suborder Araneomorphae

Family Agelenidae

Tegenaria selva Roth (det. W.J. Gertsch)

Records—Sótano de Abernathy, Sótano de las Arañas, Cueva de los Caballos, Sótano de la Golondrina, Cueva de la Laguna, Cueva de las Moscas, Sótano de Puerto de los Lobos, and Sótano de Ojo de Agua.

Bibliography—Gertsch, 1971.

Family Caponiidae

Orthonops lapanus Gertsch and Mulaik (det. W.J. Gertsch)

Records—Sótano at Valle de los Fantasmas.

Family Clubionidae

Phrurotimpus sp. (det. W.J. Gertsch)

Records—Cueva de la Puente.

Comment—This species is probably an accidental.

Family Linyphiidae

Eperigone sp. (det. W.J. Gertsch)
Records—Sótano de Puerto de los Lobos.

Family Nesticidae

Nesticus pallidus Emerton (det. W.J. Gertsch)
Records—Cueva de la Laguna, Sótano de la Golondrina, Cueva de la Puente, Sótano de San Francisco, and Sótano at Valle de los Fantasmas.

Bibliography—Gertsch, 1971.

Family Pholcidae

Coryssocnemis abernathyi Gertsch
Records—Sótano de Abernathy, Cueva de los Caballos, Sótano de la Golondrina, and Cueva de las Moscas.

Bibliography—Gertsch, 1971; 1973.

Metagonia punctata Gertsch (det. W.J. Gertsch)
Records—Cueva de Carnicerías, Cueva de Entrada Chica, Cueva de la Puente, and Sótano at Valle de los Fantasmas.

Bibliography—Gertsch, 1971; 1973.

Modisimus sp. (det. W.J. Gertsch)
Records—Sótano at Valle de los Fantasmas.

Psilochorus concinnus Gertsch (det. W.J. Gertsch)
Records—Cueva de Cinquenta y Ocho.
Bibliography—Gertsch, 1973.

Family Symphytognathidae

Maymena chica Gertsch (det. W.J. Gertsch)
Records—Cueva de los Caballos, Cueva de Cinquenta y Ocho, and Cueva de la Puente.
Bibliography—Gertsch, 1973.

Order Opiliona

Family Cosmetidae

Cynorta jamesoni Goodnight and Goodnight
Records—Sótano de Puerto de los Lobos.
Bibliography—Goodnight and Goodnight, 1973.

Family Phalangodidae

Karos parvus Goodnight and Goodnight
Records—Sótano de Puerto de los Lobos.
Bibliography—Goodnight and Goodnight, 1971.

CLASS DIPLOPODA

Order Chordeumida

Family Trichopetalidae

**Poterpes egeo* Causey
Records—Cueva de la Puente and ?Sótano de Puerto de los Lobos.
Bibliography—Causey, 1969; Reddell, 1971.
Comment—This troglobite is presently known only from these two caves.

Order Julida

Family Paraiulidae

Paraiulus sp. (det. N.B. Causey)
Records—Cueva de Carnicerías, Sumidero de Fantasmas, and Sótano de Puerto de los Lobos.

Comment—This is apparently an undescribed species.

Order Polydesmida

Family Rhachodesmidae

Strongyloidesmus sp. (det. N.B. Causey)
Records—Sótano de Puerto de los Lobos.
Strongyloidesmus potosianus (Chamberlin) (det. N. B. Causey)

Records—Sumidero de Fantasmas.

Bibliography—Causey, 1973.

Tiphallus frivolus Causey (det. N.B. Causey)

Records—Sótano de Nopales.

Bibliography—Causey, 1973.

Family Stylodesmidae

Bolivaresmus sp. (det. N.B. Causey)
Records—Cueva de la Puente.
Comment—This is apparently a new species.

Ceratesmus sp. (det. N.B. Causey)
Records—Cueva de Cinquenta y Ocho.
Comment—This is apparently a new species.

Family Xystodesmidae

Rhysodesmus sp. (det. N.B. Causey)
Records—Sumidero de Fantasmas.

CLASS INSECTA

Order Diplura

Family Campodeidae

Unidentified genus and species (det. W.R. Elliott)
Records—Cueva de los Caballos.
Comment—A single specimen was taken in the dark zone.

Order Collembola

Family Entomobryidae

Pseudosinella reddelli Christiansen (det. K. Christiansen)
Records—Cueva de Cinquenta y Ocho, Sótano de la Golondrina, Sótano de Ojo de Agua, and Cueva de la Puente.
Bibliography—Christiansen, 1973.

Order Ephemeroptera

Family Leptophlebiidae

Neochoroterpes mexicanus Allen (det. R.K. Allen)
Records—Cueva de la Puente.
Comment—Nymphs were taken in 19°C stagnant water.

Order Odonata

Family Coenagrionidae

Argia sp. (det. O.S. Flint)
Records—Cueva de la Puente and Sótano de San Francisco.
Comment—Nymphs were taken from water in both caves.

Family Cordulegasteridae

Cordulegaster diadema Selays (det. O.S. Flint)
Records—Cueva de la Puente.
Comment—One nymph was collected from 19°C stagnant water.

Order Dermaptera

Family Forficulidae

Ancistrogaster sp. cf. *toltecus* (Scudder) (det. A.B. Gurney and A. Brindle)
Records—Cueva de la Puente.
Comment—This is apparently a new species.
Ancistrogaster impennis Bormans (det. A.B. Gurney)
Records—Cueva de Carnicerías.

Order Hemiptera

Family Belostomatidae

Abedus immensus Menke (det. R.C. Froeschner)
Records—Cueva de la Laguna and Cueva de la Puente.
Comment—A male with eggs on its back was taken in a stagnant pool in Cueva de la Puente.

Family Dipsocoridae

Unidentified genus and species (det. S. Szerlip)
Records—Cueva de la Puente.

Family Gerridae

Gerris remigis Say (det. R.C. Froeschner)
Records—Sótano de San Francisco n. 2.
Comment—This common species was abundant in the 12°C water at the bottom of the cave.

Family Veliidae

Microvelia ? *beameri* McKinstry (det. S. Szerlip)
Records—Cueva de la Puente.
Rhagovelia varipes Champion (det. S. Szerlip)
Records—Cueva de la Puente.

Order Saltatoria

Family Rhaphidophoridae

Exochodrilus sp. (det. T.H. Hubbell)
Records—Sótano de Abernathy, Sótano de las Arañas, Sótano de Carlos, Cueva de Carnicerías, Cueva de Entrada Chica, Sumidero de Fantasmas, Sótano de la Golondrina, Sótano de Ojo de Agua, Cueva de las Moscas, Sótano del Pájaro, Sótano de Puerto de los Lobos, Sótano de Super-Macho, and Sótano at Valle de los Fantasmas.
Comment—This apparently represents an undescribed species. Crickets taken in Cueva de los Caballos, Cueva de Cinquenta y Ocho, and Cueva de la Laguna are probably this species.

Order Coleoptera

Family Cantharidae

Discodon sp. (det. T.J. Spilman)
Records—Cueva de la Puente

Family Carabidae

Agonum (Platynus) sp. (det. T.C. Barr)
Records—Sótano de la Golondrina and Cueva de la Puente.
Comment—This species may be a troglophile or troglaxene.

Amara sp. (det. T.C. Barr)

Records—Sótano de la Golondrina.
Comment—This is probably an accidental.

Bembidion sp. (det. T.C. Barr)

Records—Sótano de San Francisco n. 2.
Comment—This is probably an accidental.

Colpodes sp. (det. T.C. Barr)

Records—Sótano de Puerto de los Lobos.

**Mexaphaenops fishi* Barr (det. T.C. Barr)

Records—Small cave at Valle de los Fantasmas and Sótano de la Golondrina.

Bibliography—Barr, 1967; 1971.

Comment—This is an apparent troglomite.

? *Mexisphodrus* sp. (det. T.C. Barr)

Records—Sumidero de Fantasmas, Sótano de la Golondrina, Sótano del Pájaro, Cueva de la Puente, Sótano de Puerto de los Lobos, Sótano de San Francisco n. 2, and Sink at Valle de los Fantasmas.

Comment—This trogliphilic species may actually belong in the genus *Colpodes*.

Family Chrysomelidae

Heikertingerella sp. (det. R.E. White)

Records—Sótano de San Francisco n. 2.
 Comment—This accidental species was taken in the twilight zone of the entrance pit.

Family Elateridae
Aeolus sp. (det. T.J. Spilman)
 Records—Sumidero de Fantasmas.

Family Elmidae
Cylloepus sp. (det. P.J. Spangler)
 Records—Cueva de la Puente.

Family Lampyridae
 Unidentified genus & species (det. D.M. Anderson)
 Records—Sótano de Puerto de los Lobos.
 Comment—Only larvae of this family were collected.

Family Ptilodactylidae
Ptilodactyla sp. (det. T.J. Spilman)
 Records—Cueva de la Puente.

Family Scarabaeidae
Ancognatha manca LeConte (det. H.F. Howden)
 Records—Cueva de la Puente.
 Comment—This species is common in México and is accidental in the cave.

Aphodius sp. (det. H.F. Howden)
 Records—Cueva de los Caballos.
 Comment—A single specimen was collected in the entrance area, where it may have been feeding on dung.

Ataenius cognatus LeConte (det. O.L. Cartwright)
 Records—Sumidero de Fantasmas.

Diplotaxis sp. (det. O.L. Cartwright)
 Records—Sótano de Puerto de los Lobos.

Family Silphidae
Silpha cayennensis Sturm. (det. T.J. Spilman)
 Records—Cueva de la Puente.

Family Staphylinidae
Aleocharinae genus et sp. (det. L.H. Herman)
 Records—Cueva de la Puente.

Carpelimus sp. (det. L.H. Herman)
 Records—Cueva de la Puente.

Deleaster trimaculata Fall (det. L.H. Herman)
 Records—Cueva de la Puente.

Homaeotarsus sp. (det. L.H. Herman)
 Records—Cueva de la Puente.

Neomedon sp. (det. L.H. Herman)
 Records—Cueva de la Puente.

Staphylinus sp. (det. L.H. Herman)
 Records—Cueva de la Puente.

Stilicolina condei Jarrige (det. L.H. Herman)
 Records—Cueva de la Puente and Cave at San Francisco.
 Comment—This troglophile species ranges north into Texas.

Family Tenebrionidae
Eleodes sp. (det. T.J. Spilman)

Records—Cueva de los Caballos and Cueva de Cinquenta y Ocho.
 Comment—Specimens were collected at the dark edge of the twilight zone in Cueva de los Caballos and in the entrance of Cueva de Cinquenta y Ocho.

Eleodes sp. nr. *rotundicollis* Eschscholtz (det. T.J. Spilman)
 Records—Cueva de Carnicerías.

Eleodes sp. nr. *solieri* Champion (det. T.J. Spilman)
 Records—Sótano at Valle de los Fantasmas.

Eleodes sallei Champion (det. T.J. Spilman)
 Records—Sótano de Abernathy, Cueva de Cinquenta y Ocho, Sótano de la Golondrina, Cueva de las Moscas, Sótano de Nopales, Sótano de Ojo de Agua, Sótano del Pájaro, Sótano de Puerto de los Lobos, and Sótano de Super-Macho.
 Comment—This species is a troglaxene. One specimen was collected in the dark zone of Cueva de Cinquenta y Ocho.

Eleodes solieri Champion (det. T.J. Spilman)
 Records—Sumidero de Fantasmas.

Order Trichoptera

Family Calamoceratidae
Phylloicus sp. (det. O.S. Flint)
 Records—Cueva de la Puente.
 Comment—Larvae and their leaf-constructed cases were collected in 19°C stagnant water.

Family Philopotamidae
Wormaldia sp. (det. O.S. Flint)
 Records—Cueva de la Puente.
 Comment—A single female was collected in the dark zone.

Family Psychomyiidae
Polycentrepus sp. (det. O.S. Flint)
 Records—Cueva de la Puente.
 Comment—One larva was collected in 19°C stagnant water.

Polycentrepus picana Ross (det. O.S. Flint)
 Records—Cueva de la Puente.
 Comment—One adult was collected in the dark zone.

Order Lepidoptera

Family Tineidae
Tinea sp. (det. D.R. Davis)
 Records—Cueva de la Laguna.

Order Diptera

Family Calliphoridae

- Calliphora vicina* R.-D. (det. R.J. Gagné)
 Records—Sótano de San Francisco.
 Comment—One adult was collected at the bottom of the entrance pit near a pool laden with human fecal matter.
- Phaenicia* sp. (det. R.J. Gagné)
 Records—Sótano de San Francisco.
 Comment—A single larva was taken from a pool laden with fecal matter at the bottom of the entrance pit.
- Family Cecidomyiidae
Lestodiplosis sp. (det. R.J. Gagné)
 Records—Cueva de la Puente.
- Family Chironomidae
 Unidentified genus and species (det. W.W. Wirth)
 Records—Sótano de Ojo de Agua.
- Family Dolichopodidae
Chrysotus sp. (det. G.C. Steyskal)
 Records—Sótano de San Francisco n. 2.
Peloreopeodes cornutus Van Duzee (det. G.C. Steyskal)
 Records—Cueva de la Puente.
- Family Drosophilidae
 Unidentified genus and species (det. W.W. Wirth)
 Records—Sótano at Valle de los Fantasma.
Drosophila sp. (det. W.W. Wirth)
 Records—Sótano de San Francisco n. 2.
- Family Empididae
Drapetis sp. (det. G.C. Steyskal)
 Records—Sótano at Valle de los Fantasma.
- Family Mycetophilidae
 Unidentified genus and species (det. R.J. Gagné)
 Records—Cueva de la Puente.
Rymosia sp. (det. R.J. Gagné)
 Records—Cueva de los Caballos and Cueva de Cinquenta y Ocho.
- Family Scenopinidae
Pseudatrichia sp. nr. *melanderi* Kelsey (det. L.V. Knutson)
 Records—Cueva de Cinquenta y Ocho.
- Family Sciaridae
Bradysia sp. (det. R.J. Gagné)
 Records—Cueva de la Puente.
- Family Sphaeroceridae
Leptocera sp. (det. G.C. Steyskal)
 Records—Cueva de Cinquenta y Ocho and Sótano de San Francisco n. 2.
- Family Tipulidae
Epiphragma (Epiphragma) sp. (det. G.W. Byers)
 Records—Sótano de San Francisco.
 Comment—This may be a new species.
Limonia (Dicranomyia) sp. (det. G.W. Byers)
 Records—Sótano de la Golondrina.

Order Hymenoptera

Family Formicidae

Pheidole sp. (det. D.R. Smith)

Records—Sótano de San Francisco n. 2.

Comment—Accidental; the head and thorax of a worker were collected at the bottom of the entrance pit.

Tapinoma sp. (det. D.R. Smith)

Records—Sumidero de Fantasmas.

Family Ichneumonidae

Orthocentrus sp. (det. R.W. Carlson)

Records—Cueva de la Puente.

Comment—This is probably a parasite of fungus gnats (Mycetophilidae).

PHYLUM CHORDATA

CLASS AMPHIBIA

Order Urodela

Family Ambystomidae

Ambystoma tigrinum (Green) (det. R. Newcomer, W.R. Elliott)

Records—Sótano de Abernathy, Sótano de la Golondrina, and Sótano de Puerto de los Lobos.

Family Plethodontidae

Pseudoeurycea sp. (det. J.R. Reddell)

Records—Sótano de Abernathy, Sótano de la Golondrina, Sótano de Puerto de los Lobos, and Sótano de Ojo de Agua.

Bibliography—Walsh, 1972.

Comment—This species is frequently found on the walls of entrance pits.

Order Anura

Family Leptodactylidae

Syrrophus longipes (Baird) (det. J.D. Lynch)

Records—Sótano de Puerto de los Lobos.

Comment—A single frog collected from Sótano de la Golondrina may be this species.

CLASS MAMMALIA

Order Chiroptera

Family Phyllostomatidae

Artibeus sp. (det. T.R. Mollhagen)

Records—Cueva de la Puente.

Comment—A colony of perhaps several hundred Leaf-nose bats roosts near the smaller, upper entrance. Other than one dead bat seen at the bottom of Sótano de Ojo de Agua, bats

have not been observed in any other cave in the Valle de los Fantasma Region.

LITERATURE CITED

- Barr, T.C., Jr. 1967. Three new cave trechines from Mexico (Col., Carab.). *Ciencia, Méx.*, 25: 161-166, figs. 1-6.
- Barr, T.C., Jr. 1971. A new species of *Mexaphaenops* from Tamaulipas, México (Coleoptera: Carabidae). *Assn. Mex. Cave Stud. Bull.*, 4: 113-116.
- Causey, N.B. 1969. New trichopetalid (Chordeumidea: Chordeumida) millipedes from caves in North and Central America. *Proc. Louisiana Acad. Sci.*, 32: 43-49.
- Causey, N.B. 1973. Millipedes in the collection of the Association for Mexican Cave Studies. II. Keys and additional records and descriptions (Diplopoda). *Assn. Mex. Cave Stud. Bull.*, 5:
- Christiansen, K. 1973. The genus *Pseudosinella* in Mesoamerican caves. *Assn. Mex. Cave Stud. Bull.*, 5:
- Fish, J. 1966. Trip report. *Assn. Mex. Cave Stud. News.*, 2(6): 137-139.
- Fish, J., and J.R. Reddell. 1966. Trip report. *Assn. Mex. Cave Stud. News.*, 2(4): 82-86.
- Gates, G.E. 1971. On some earthworms from Mexican caves. *Assn. Mex. Cave Stud. Bull.*, 4: 3-8.
- Gates, G.E. 1973. Contributions to North American earthworms (Annelida). No. 8—The earthworm genus *Octolasion* in America. *Bull. Tall Timbers Res. Sta.*, 14: 29-50.
- Gates, G.E. 1973a. On more earthworms from Mexican caves. *Assn. Mex. Cave Stud. Bull.*, 5: 21-24.
- Gertsch, W.J. 1971. A report on some Mexican cave spiders. *Assn. Mex. Cave Stud. Bull.*, 4: 47-111.
- Gertsch, W.J. 1973. A report on cave spiders from México and Central America. *Assn. Mex. Cave Stud. Bull.*, 5:
- Goodnight, C.J., and M.L. Goodnight. 1971. Opiliones (Phalangida) of the family Phalangodidae from Mexican caves. *Assn. Mex. Cave Stud. Bull.*, 4: 33-45.
- Goodnight, C.J., and M.L. Goodnight. 1973. Opiliones (Phalangida) from Mexican caves. *Assn. Mex. Cave Stud. Bull.*, 5:
- Mitchell, R.W. 1969. A comparison of temperate and tropical cave communities. *Southwestern Nat.*, 14(1): 73-88.
- Muchmore, W.B. 1973. New and little known pseudoscorpions, mainly from caves in México (Arachnida, Pseudoscorpionida). *Assn. Mex. Cave Stud. Bull.*, 5: 47-62.
- Reddell, J.R. 1971. A preliminary bibliography of Mexican cave biology, with a checklist of published records. *Assn. Mex. Cave Stud. Bull.*, 3. 184 pp.
- Reddell, J.R., and R.W. Mitchell. 1971. A checklist of the cave fauna of México. II. Sierra de Guatemala, Tamaulipas. *Assn. Mex. Cave Stud. Bull.*, 4: 181-215.
- Reddell, J.R., and R.W. Mitchell. 1971a. A checklist of the cave fauna of México. I. Sierra de El Abra, Tamaulipas and San Luis Potosí. *Assn. Mex. Cave Stud. Bull.*, 4: 137-180.
- Reddell, J.R., and W.R. Elliott. 1973. A checklist of the cave fauna of México. IV. Additional records from the Sierra de El Abra, Tamaulipas and San Luis Potosí. *Assn. Mex. Cave Stud. Bull.*, 5:
- Reddell, J.R., and W.R. Elliott. 1973a. A checklist of the cave fauna of México. V. Additional records from the Sierra de Guatemala, Tamaulipas. *Assn. Mex. Cave Stud. Bull.*, 5:
- Rzedowski, J. 1965. Vegetación del Estado de San Luis Potosí. *Contribuciones del Instituto de Investigación de Zonas Desérticas, Universidad Autónoma de San Luis Potosí*, No. 20, *Act. Cien. Potos.*, 5(1-2): 1-291.
- Walsh, M., ed. 1972. *Mexican caving of the Southwest Texas Grotto*. Southwest Texas Grotto, San Marcos. 146 pp.

Fig. 1. Map of Valle de los Fantasma Region, San Luis Potosí, México, showing known caves. Dots represent caves for which biological records are available, stars represent other caves, and question marks indicate caves for which locations are uncertain. Key to caves: 1. Cueva de la Laguna; 2. Sótano de Carlos; 3. Cueva de los Caballos; 4. Sótano de la Golondrina; 5. Sumidero de Fantasma; 6. Sótano del Pájaro; 7. Unnamed 35 m pit; 8. Sótano de las Arañas; 9. Cueva Delgada; 10. Sótano de Abernathy; 11. Sótano de Super-Macho; 12. Unnamed, unentered pit; 13?. Cueva de Entrada Chica; 14?. Cueva de Aguacate; 15?. Cueva de Carnicerías; 16. Cueva de la Iglesia; 17. Sótano de San Francisco; 18. Sótano de Ojo de Agua; 19. Sótano de San Francisco n. 2; 20. Cueva de las Moscas; 21. Sótano de Puerto de los Lobos; 22?. Sótano de Enero; 23. Cueva de Cinquenta y Ocho; 24. Sótano de Nopales; 25. Cueva de Sierra Blanca; 26. Unnamed cave in sinkhole; 27. Unnamed 15 m pit; 28. Unnamed 10 m pit; 29. Unnamed large blind pit; 30. Unnamed small cave; 31?. Cueva de Salida de Agua de la Puente; 32?. Cueva del Agua; 33. Unnamed small pit; 34. Unnamed small cave; 35. Cueva de la Puente; 36?. Cueva de la Virgen.

