NATURAL BRIDGE CAVE
TEXAS JAN 1962

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Editorial

I had no idea that response to this paleo--archaeo issue would be as great when I first ran the idea over in my mind. I wish to thank all who participated and sent in articles and expressed interest in letters.

Of note is the bibliography compiled by Bud Frank of all published material on vertebrate paleontology to date pertaining to the caves of Texas. We feel this is perhaps the only complete list now available anywhere.

Of importance to the Texas Speleological Association is the coming board of governors meeting to be held at a time and place to be announced soon. Several items of particular interest and importance will probably be discussed, including (1) whether or not the Association would like to invite the N.S.S. convention to Texas in 1964, (2) the best and easiest way to catalog and number Texas caves over 1,114 caves, and (3) adoption of a report form for possible use of Association grottos, groups and independents. Plans to attend the S.G.S. meeting, and be prepared to express your ideas on these and other items of business. The meeting will no doubt be held sometime during the first of May.

There is still very few subscriptions coming in. Your help in getting friends to subscribe will be appreciated very much. Remind those whose subscriptions have expired to renew them as soon as possible.

Before closing, I would like to apologize to Alamo Grotto for overlooking their grotto news last month. I had it around all this too full of scattered debris, but did not find it until a few days ago.

Cover Photos: The remarkable pictures of the pleistocene bear jaws found in natural bridge cave are by William R. Gray of San Antonio. The upper photo is the mandible - the lower photo, the upper left (Maxillary). See article on page 45.

Be Safe -- Cave Safe!
A VERTICAL CAVE BURIAL IN
UVALDE COUNTY, TEXAS

by Alice and Bob Benfer (U.T. Grotto)

The Fred Mason, Jr., Ranch, located north of Uvalde, Texas, has ten caves, ranging from the longest surveyed cave in Texas to a grubby 30-foot shaft. Indian Creek Cave, with its four miles or so of passage is of obvious interest to speleologists—the authors included. Except for the remote possibility of the thirty foot shaft, which is called, with typical spelunker originality, Burial Cave, forming a link with the Indian Creek System, it is really of no speleological interest. However, when viewed from an archeologist's outlook, the cave is an exciting one.

Burial Cave is the repository of a large number of bones, identified as typical Indian (more or less Mongoloid, if you did not know). Although Indians utilized shelters for habitation and burial, it is rare for a real cave to be used for either. However, it is even more rare, that a vertical cave is used for burying. In fact, the only published report of a vertical cave being used for burial in the western hemisphere is Candelaria Cave in Coahuila, Mexico. The authors have found or have been informed of three apparent burial caves in the Uvalde area, and have spent some time working on the Mason Burial Cave.

Location and Description of Site.
The cave is located on the southwestern margin of the Edwards Plateau. Since the cave lies on the uplifted side of the Balcones Escarpment, the relief is fairly rugged. The cave is located 75 yards from the crest of a hill, and is three-quarters of a mile from Indian Creek, a large, usually dry creek of the type which drains most of northern Uvalde Co. Vegetation is sparse, consisting primarily of mesquite, brush, and cactus.

When cleared of dirt and clay fill, the cave is essentially vertical and the walls are practically unscalable. The cave is rich in bones and poor in cultural material (worked flint, bone tools, etc.)

History of Investigations. In early May, 1961, Fred Mason, Jr., began digging the cave in search of water and or a connection with the Indian Creek System. Between May, 1961, and November, 1961, Mr. Mason had reached a level about 32 feet below the surface. At this level which still is the lowest point that he has dug (as of April 2, 1962), the cave began to open up into a room. The room, which is mostly filled with silt, goes only to a small pit (which reaches, in a grubby sort of way, 50 feet below the entrance to the cave.)

Mr. Mason reported that skeletons were evidently laid on ledges at depths from the surface of about 12 feet, 17 feet, and 22 feet. Below that level, human skeletal material was never articulated by either Mr. Mason or the authors. Some worked flint was found at all levels.

The Deposits. When the authors first looked at the cave, before Mr. Mason began digging, the sink was filled with dry dirt and animal nests to within a foot of the surface. Below four feet, and continuing more or less uniformly to about 20 feet, as well as in pockets at lower levels, the second type, Chernozem, (Ruben M. Frank, pers. comm.), is found. This type of soil is typically produced by calcium carbonate rock exposed to weathering, in this case, Edwards limestone. Red clay, of the type found in most of the caves of the area, begins to show up
in large quantities at about 20 feet and continues to the 32-foot level. This clay is usually formed by the leaching action of water on limestone, and may be considered as secondary deposition (Ruben M. Frank, pers. comm.) Of course, lime -
stone fragments are found throughout the depth of the cave.

Skeletal Remains, human. Mr. Mason encountered a large number of human bones throughout the depth of the cave. A large number have been identified by the authors, but for the sake of brevity will not be listed herein. Since the bones were not scientifically excavated, it is difficult to determine exactly how many individuals are represented. However, the range is probably from 50 to 150 individuals, with the authors guessing in the eighties. Some bones were burned, and many long bones were split in a manner which does not suggest natural decomposition.

Skeletal Remains, animal. The animal remains are considered by Miss Margaret Criddlebough in a paper presented on page 43 of this issue.

Cultural deposits. A large amount of worked flint has been identified and catalogued by the authors, but again, for the sake of brevity, will not be presented herein. The only material of any interest is several dart points (used on spears, not arrow shafts), and a special type of engraving tool known as burins. The dart points, of the Nolan type, common in Central Texas, at least give us some date for the material. They were classified as early Archaic, which means that they were made (on the basis of Radiocarbon dates of the same point from other sites) approximately four to six thousand years ago. Unfortunately, none of the artifacts were recovered in situ (in place), and so the association is not definite. However, Mr. Mason recovered the points either from the cave or the excavated earth, and no doubt exists in the author's minds as to the associations.

CONCLUSIONS. Obviously, the cave was used as a receptacle for human skeletons. The large number of animal skeletons found in the cave may or may not have been thrown in by humans. The people who are represented to archeologists by Nolan points probably buried at least some individuals there, if not the majority. Although the bones from the higher levels appeared to be actually buried (by Mr. Mason), those on the lower levels do not exhibit such a pattern. Perhaps the bodies were merely dumped in, or then again, perhaps they were washed into new positions by water. However, since burned bone was found, and many of the long bones are split (to obtain marrow?), perhaps the peoples inhabiting the area were cannibalistic. Cannibalism would explain the appearance of strewn bones at lower levels.

(NOTE to spelunkers: Since the authors are interested in Indian remains of any kind (skeletal, flint, bone, etc.) in caves, and especially vertical caves, any spelunkers who might encounter any of the above could be a big help to the authors by writing them at: Box 7672, U. T. Station, Austin 12, Texas, of any such material they might find. We would certainly appreciate it. –The Benfers.)

THE NEARSIGHTED PROFESSOR

"I say, Rothschild, this bone specimen seems quite well-preserved!"
PALEONTOLOGY OF BURIAL CAVE

UVALDE COUNTY, TEXAS

A PRELIMINARY REPORT

by Margaret Cridlebaugh

Burial Cave, located on the Fred Mason Ranch, is approximately 20 miles north-northwest of Uvalde, Texas. Mr. Mason had begun excavating the filled cave in hopes of finding a source of water near his ranch house. The cave, which is situated near the top of a hill about a quarter of a mile from the house, is an elliptically shaped sinkhole four feet by eight feet, and has nearly vertical sides. Near the top of the pit, a series of primitive handworked weapons of the Nolan type were found, and on a ledge 10 feet below the surface a complete human skeleton was uncovered. At the 15-foot level two more skeletons were found, and again at the 20 foot level workmen found the remains of five humans. Bones of small animals were profusely scattered throughout the entire excavated depth of the cave which at the present time is 36.5 feet.

On May 14, 1961, Alice and Bob Benfer from the University of Texas Grotto of the National Speleological Society visited Burial Cave. The Benfers, who are interested in archeology and anthropology, went to see the human bones and do some digging of their own a more scientific nature.

On November 5, 1961, Mr. Mason, Bud Frank, and I made a trip to Burial Cave. At this time 75 pound samples of two clay types were taken from two levels. The small animal bones included in these samples will be used to gain some insight into the ecological conditions in the cave area at the time of their deposition.

The clay samples were taken to the Vertebrate Paleontology Laboratory at Balcones Research Center where they were washed according to the Hibbard process. In this process two or three pounds of clay are put in a box with a screen-wire bottom and placed under running water. The clay particles are taken into suspension and out through the wire. The rock and bone, which are left in the box are then spread out to dry and be picked. After the concentrate is thoroughly dried tweezers and a magnifying glass are used to separate the bone from the matrix. After picking, the bones are separated into groups of jaws, teeth, limb bones, vertebrae, etc. Jaws and teeth are the main bones used for identification because each species has a characteristic dental pattern. As a general rule, if any bones from a particular animal are preserved, jaws and teeth will be preserved also.

I think here it would facilitate the discussion if I followed through with the classification of a particular specimen.

At this point kingdom, phylum, class and order are known; these are Animalia, Vertebrata, Mammalia and Rodentia. The separation into families depends on the number of teeth which have been modified to grind food. Those animals which have four molars and premolars on each side of each jaw belong in the family Heteromyidae; those with just three molar, in the family Cricetidae.

The next step is the long, tedious job of comparison between the unknown jaw and recent specimens. With the aid of a binocular microscope, the dental pattern of a molar in the Heteromide jaw is studied and the main convolutions are sketched. The scaled drawing is then compared with similar drawings of the patterns characteristic of each genus in the family Heteromyidae. In this case, the tooth looks the most like the drawings for the genus Perognathus. To check this identification, the teeth themselves are compared with a Recent specimen of Perognathus. If they are the same, the next
and final step is to determine the species. This involves comparing the unknown teeth with the teeth of all the species of *Perognathus* available. Taking into consideration normal species variations, the species which most closely resembles the unknown is the species of the unknown. In this case it is *hesperus*.

Although it was possible to break this particular specimen down as far as species, in some instances this is not true. In some genera such as *Neotoma* the dental patterns of the species are so similar that they are difficult to distinguish. In these cases genus is the lowest taxonomic level attainable.

When all of the specimens have been identified, they can be used to determine what the climate was like in the area in which they lived. Each animal has limited tolerances, that together make up its ecology, outside of which it cannot survive. If the ecologies are known for a contemporary group of animal, the similarities in them will indicate the conditions of their habitat. If all the species found are still extant in the area of deposition, the climate of that area is approximately the same as it was when these animals were alive. If, however, one or more species are now extinct in the area, it is, in all probability, an indication that the climate has changed. The change may be drastic or slight depending on the length of time involved. The age of the oldest deposits in Burial Cave is estimated to be between 4,000 and 6,000 years old. The age was determined from the presence of the Nolan points which are known to be of this period. There is an unverified occurrence in the deposits of the genus *Dipodomys*, which, if authenticated, would be evidence that the Uvalde area was at one time in the near geologic past much drier than it is at the present time.

Unfortunately, up until now I have not been able to finish the identification, classification and ecologic work on many of the bones found in Burial Cave. A report of the completed investigation will be sent to the *CAVER* at a later date.

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**PRELIMINARY FAUNAL LIST**

**Burial Cave, Texas**

**Class Mammalia**

**Order Rodentia**

*Onymys leucogaster* - grasshopper mouse  
*Sigmodon hispidus* - cotton rat  
*Neotoma micropus* - wood rat  
*Neotoma sp.* - wood rat  
*Peromyscus sp.* - field mouse  
*Perognathus hesperus* - pocket mouse  
*Perognathus sp.* - pocket mouse

**Order Lagomorph**

*Sylvilagus floridanus* - cotton-tail rabbit

**Order Artiodactyla**

*Odocoileus sp.* - deer  
*Capra sp.* - goat

**Order Carnivora**

? *Methina sp.* - skunk  
*Canis familiaris* - domestic dog  
*Canis latrans* - coyote

Also unidentified frogs, lizards, snakes, shrews, bats.

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**NOTE ON CAVE CONSERVATION:**

On the recent trip by the San Angelo College Speleological Society to Longhorn Caverns I was somewhat astonished and embarrassed to see carbide dumpings so prominent. After requiring our group to carry plastic bags for used carbide, I was somewhat depressed. It may not be necessary to carry the carbide out, since the water passage could cause acetylene to be released, but the carbide could at least be buried. Remember in caving the safety of oneself comes first; second comes the importance of the preservation of the cave; and last comes man's likes and dislikes. If one is too lazy that he cannot clean up his own mess, he can at least hide it to keep from showing his ignorance.

— R. E. B.

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**WATCH FOR ANNOUNCEMENTS CONCERNING THE UPCOMING MIDYEAR BOARD OF GOVERNORS MEETING OF THE TEXAS SPELEOLOGICAL ASSOCIATION.** IT'S ALWAYS OPEN TO EVERYONE AND WILL MOST LIKELY BE HELD AROUND MAY 5th.
The Hill Country of Central Texas was a heavily forested region with tremendous annual rainfall during the last million years of the Pleistocene. The last of the great glacier ice sheets covering much of the northern hemisphere stayed several hundred miles north of this area but certainly made it a cold wet, and foggy wilderness where gigantic mammals fought each other for survival. The now extinct bison *latifrons*, weighing up to four times our latter day Bison bison, had to contend with great lions with slashing nine-inch canine teeth, and the ferocious dire wolf as well as Paleo-American hunters who often fired great arrows to kill the game. Emperor elephant, mastodons, camels, the native horses (which died out long before the conquest) huge ground sloths, bears bigger than Kodiaks, as well as big peccaries all milled about in this area and have left their remains in a few accessible caves.

The extinct animals remains are very scarce, unbelievably disintegrated, and usually very difficult to remove successfully. What is more, the fragmentary bones recovered are often impossible to identify. One large canine tooth (a dense material usually better preserved than other skeletal parts) may suggest any one of several unrelated carnivores such as wolf, lion or bear. Even when enough material is found to make identification fairly certain, the real problem of when the animal may have lived remains to puzzle the serious investigator. The problem becomes acute when human artifacts are found in close association with the remains of an obviously extinct species.

Folsom dart points with mastodon remains is a typical problem. We want to know as exactly as possible when the mastodon died and thereby arrive at a date which will tell us when the ancient hunters lived. Fortunately the Libby carbon 14 dating technique can establish this date with reasonable certainty if various critical bits of evidence can be established. First, there must be no doubt that the flint projectile point belongs with the animal remains because normal movement of earth by rainwater can shift and rearrange the components. A point found imbedded in a vertebra just as it lodged when Folsom man drove in his spear makes an incontrovertable case. Folsom points lying in the same bed of silt as old bones may or may not be of the same age, depending on the history of that particular layer of dirt. This is a job calling for the most meticulous detective work by carefully trained observers.

It must be stressed that no cave fill material should be excavated by persons who are not in a position to evaluate what they find. Never to be replaced keys to ancient cultures may be lost forever if they are carelessly removed from the only position where their occurrence is meaningful. Look for places where such material may be found and then look for expert assistance in getting the most information from it.

by

William R. Gray, Alamo
Much work has been done in years past in Longhorn Caverns, but a few notes on the recent trip by fifteen members of the San Angelo College Speleological Society and two members of the University of Texas Grotto of NSS may be of interest. Everyone will remember those gruesome trips in 1957, 1958 by the Texas Region under the direction of Harvey Jackson of the Corpus Christi Grotto. The trip by the SACSS on March 30 and 31 has been one of the few since the "project", Mr. Clawson, manager of the cave related.

Groups of four and five revisited most of the entire cave and possibly some that was not visited prior to this trip because of high water. Mr. Clawson said that the cave is drier than it has been in many years. On the map made by Dave Kysar of the UTSS it is shown that the passage beyond Salamander Trail was blocked by high water in 1958. His map of the cave stops here. However, now the passage is not blocked. There is about three inches of air between the water and ceiling, making it possible to continue exploration. After about fifty feet one is able to stand up and walk. A conservative "guesstimation" of 2,000 to 3,000 feet can be explored beyond this point. Most of the passage is of walking size but some crawling is required. The passage terminates in another pool impassable because of high water. I am not certain if anyone has explored this passage, but I definitely do not have record of it. It is hoped that we will be able to return soon to make a survey and determine the distance beyond Salamander Trail. (if anyone has been in and/or surveyed it, I would appreciate a letter to this effect.)

In Wiggly Passage one pool floating calcite crystals (cave ice?) was observed. Regardless of the significance of our trip, members of the SACSS returned exhausted, but happy.

On the return trip home five members took time to locate Bat Cave Cavern south of Mason. We arrived there just as the evening bat flight began.

Another cave west of the bat cave was located before returning to San Angelo. We are planning a trip for this area in the near future. We hope that other caves can be found. (I would appreciate information on any caves in this area before our trip. Anyone interested in meeting us there, to look for new caves, are encouraged to do so. In my files I have only three caves listed for Mason County, all of which are within one mile of one another. I am certain that there are more.)

(Ed. Note. In the November, 1961 issue of The Texas Caver, Vol. VI, No. 11 in an article entitled "Some Statistics on Texas Caves" by Ruben Frank (Pg. 127) there are 40 caves listed for Mason Co. This information (I suppose) was taken from the files of the Texas Speleological Survey).

SACSS VISITS LONGHORN CAVERNS

Sell Texas Caver Subscriptions to your friends and help promote this informative non-profit (and how!) magazine about Texas Caves, Texas Cavers, and Texas Caving News!

Name and address and $3.00 is all we need.

Plan now to attend the 18th Annual Convention of the National Speleological Society, Custer, S.D. June 13-16, 1962!!!
one of the most important and disastrous speleological and archaeological events in Texas history will occur in 1964 with the completion of the Amistad Dam. The dam will cause the flooding of one of the most beautiful parts of Texas, as well as the destruction of some of the most important archaeological sites in the state. Also directly and indirectly involved in the formation of the reservoir are numerous Texas caves.

The dam is to be located on the Rio Grande about 12 miles above Del Rio and one mile below the mouth of Devil's River. It was begun in 1960 in accordance with the Water Treaty of 1944 between Mexico and The United States. The dam will be completed in 1964. The surface of the conservation and flood pools will be at elevations of 1,117.0 feet and 1,140.4 feet respectively. Water will be impounded in the canyons of the Rio Grande, Pecos, and Devil's Rivers, as well as numerous tributary canyons. The reservoir will obtain a maximum length of 75-80 miles on the Rio Grande and will extend 18-20 miles up the Pecos River and 30 or more miles up the Devil's River. A total storage capacity of 5,977,000 acre-feet is planned.

Numerous caves and deep overhangs are to be found in the canyon walls of the reservoir site. These formed ideal habitation sites, being as they are near permanent springs and streams. As a result, they are among the richest archaeological sites in the country. One flood in the dry shelters will be sufficient to destroy artifacts preserved for thousands of years. Those sites above the level of the lake and therefore not flooded, will nevertheless be easily accessible to vandalism by pothunters and the like.

The major archaeological work done in the area has been since 1958 when the reconnaissance survey of the reservoir area was made by the Inter-Agency Archaeological Salvage Program. Prior to that the Witte Memorial Museum and the Southwest Texas Archaeological Society made limited studies in the 1930's of the Shumla Caves on the Rio Grande and Eagle Cave near Langtry. In 1932 the University of Texas carried out brief excavations at the Fate Bell Rockshelter in Seminole Canyon, but only a small portion of the site was excavated. Other work has been done in Horseshoe Cave on Cow Creek and Murrah Cave on the Pecos, but all of this work has been limited in scope.

In 1958 an archaeological survey was begun by John A Graham and W.A. Davis under the supervision of Edward B. Jelks. Intensive searching by air and land resulted in the location of several hundred sites to be investigated before the completion of the dam. Doubtless this still represents only a portion of the total material to be found in the area, but the lack of time, money, and man-power has forced the neglecting of many promising sites.

Although numerous open sites and river terrace sites are in the reservoir, including the spectacular paleo-American site on the mouth of the Devil's River, only a few of the most important shelter sites will be discussed below.

Already mentioned are the Fate Bell Rockshelter, Eagle Cave, Shumla Caves and Murrah Cave. The Fate Bell Shelter measures over 500 feet across and has a depth of 110-140 feet. There are estimated 10-15 feet of deposits, as well as a series of artistically executed pictographs. Eagle Cave is 200 feet across.
by about 80 feet deep. Depths of deposits reach 15 to 20 feet. It will be flooded intermittently, so that detailed study of it was one of the prime objectives of the archaeologists in charge of the survey.

Among other large shelters to be flooded is a 170-foot wide, 100-foot deep shelter in Satan Canyon. It appears to be rich in cultural materials with at least 2-3 feet of deposits. A large shelter in Seminole Canyon contains at least 10-foot thick deposits. It is 250 feet wide by 66 feet deep, but has been badly damaged by vandals. Farida Cave, on the Kio Grande, is 230 feet across and 115 feet deep. It contains some of the most beautiful pictographs in the state, as well as enormous midden deposits. Intensive work has been done and is being planned for this important site.

These large shelters represent a very small percentage of those to be flooded by the waters of the reservoir. They should serve to point out the tragedy that progress can bring to science.

During the past two years the most intensive archaeological work in the state has been devoted to an attempt to collect and preserve as much scientific data as is possible in one of the richest and most important archaeological fields in Texas.

A sidelight to the flooding of the archaeological sites in the reservoir of the Amistad Dam is the closing of Diablo Cave, and the eventual flooding of a large number of small-to-large caves to be found within the area. Diablo Cave is one of the largest and longest in the state, with about 1 mile of passage, much of which is 20 feet by 20 feet in size. Although the cave itself will not be flooded, fears that the waters of the reservoir might run through undiscovered cave passages and out of Diablo Cave has caused the U.S. Boundary and Water Commission to block the entrance with a wall of concrete. A further report and map of Diablo Cave is in preparation. Many other caves, both explored and unexplored, lie along the banks of the Pecos and Devil's Rivers and are certain to be flooded. Also involved in the flooding will be the lower levels of Langtry Lead Cave and Emerald Sink, as well as possibly other caves in the area. Although their entrances are well above the level of the reservoir, the great depth attained by the caves may well subject them to a severe rise in the local water table and block portions of the caves.

It is seen, therefore, that the reservoir will have lasting and disastrous results both for the archaeologist and speleologist and it is important that what work can be done must be done quickly.

CAVER-OF-THE-MONTH: WAYNE JENNINGS

Born and raised in San Angelo, Wayne Jennings is 20 years old, married, and has one daughter. Before entering San Angelo College to major in history and psychology, he graduated from San Angelo's Central High School. He will graduate from the junior college this year and hopes to continue his education at Austin.

A Watkins Products representative, Wayne has another hobby other than caving. He works in the Y.M.C.A. youth program and coached a basketball team to a league championship with a 7-0 record.

In regards to his first becoming interested in spelunking, Wayne states, "To kill some time over the Easter holidays in 1960, I tried to find Arden Cave which I had visited as a Boy Scout at 14. I found the cave, and also an interest in caving." Since that time, Wayne has caved in Irion County, Mason County, at "Y" Cave, Green Mountain Cave, and Arden Cave. He has also done caving in Sutton County. He states that the most enjoyable phase of caving is the exploration.

Along with Royce Ballinger, the present club chairman of San Angelo College Spelaeological Society, Wayne was instrumental in starting the club at S.A.C. He now holds the office of public relations man. Wayne is a member of the National Spelaeological Society.
Several moderate-sized "Indian" shelters exist in the low mountains, plateaus, and canyons of eastern Brewster County, Texas. Archaeologically, the caves contain a fair amount of cultural remains and artifacts, but of significance is the abundance of formerly inhabited caves in rugged and dry areas.

On the morning of March 31, the author and Jack Estes left Abilene on an expedition to try and locate any caves existing in the lower Cretaceous limestone areas of eastern Brewster County south and west of the city of Sanderson, Texas. Tom Heador of Eldorado joined them and the three of them rode out in car and jeep to a 270-section ranch where permission to camp and explore had been pre-arranged. The ranch includes all of Reagon Canyon, one of the most impressive of a series of deep chasms on the Rio Grande and its short tributaries.

The topography in the Reagon Canyon area is characterized by the deep canyons and steep-sided plateaus, capped by layers of thick limestone. From the vantage point atop a high mesa near the camp, in all directions can be seen deep gorges of Reagon, Spider, Hop, and other short tributary canyons, each with spectacular bluffs and cliffs of pink and brown limestone. At various places, the layers of rock contain long and shallow shelter caves. In especially those caves facing south, there are blackened ceilings and noticeably large midden deposits in front. Of note is the fact that the midden deposits, seen from a great distance, usually fanned out below the caves as a rockslide, indicated previous inhabitance.

The expedition was planned with a primary interest in trying to locate any caverns, and it was quite disappointing at first to find that the "1,600 caves," mentioned by the landowner were all shelters. However, when the midden deposits and cave floors yielded bits of burned bone, grindrocks, grind stones, scraping flints and arrowheads and shaft points, interest in these shelters rose.

It was learned from Bud Roark, the ranchers grandson, that a few months earlier, several archaeologists from San Antonio, including a Colonel Kelly and his wife, had investigated two or three of the caves located farther west and upland, and had done so quite intensively. They had also located eight to ten other shelters in which they did no excavating, but listed them briefly in a report they had made of their findings. Information on the content of this report is not available by the author at the present time.

The landowner related that other study on the shelters in the eastern part of the ranch had been done by members of the Smithsonian Institute. He did not elaborate on their work, nor was the location and sites of their work revealed.

Briefly listed below are some of the major shelters located in the Reagon Canyon area. As far as is known at this time, there has been no previous examina-
tion of the caves listed.

BIG MIDDEN SHELTER: A 35-foot shelter located on the southeast side of an isolated mesa four miles from the Bud Roark home. The entrance is 12 feet across and the cave is 15 feet in depth. In the entrance was found two grindstones, polished by use and various pieces of worked flint. 100 yards downhill from the cave was another smaller midden in addition to the one located at the cave entrance.

SOUTHWEST SHELTER: An unchecked cave on the top ridge of a low mesa in an almost direct southeasterly direction from an oil rig three miles approximately from the Roark home.

CLIFF SHELTER: In upper Reagon Canyon on a vertical 200-foot cliff. Entrance to the cave can be made only by traversing a narrow ledge beginning at the right of the cliff. The shelter measures 50 feet in length and 20-feet in depth. It is about one quarter of the distance from the top of the cliff face. No artifacts or remains were evident.

WEST SHELTER: A 20-foot in diameter circular shelter on the west side of Reagon Canyon from REA power pole # 38. There is a hole in the ceiling about two feet wide that seemed to lead to a closed upper room. A thin layer of bat guano was observed on the floor. No evidence of inhabitation.

WINDOW SHELTER: One-half mile down the Reagon Canyon from Cliff Shelter and near REA power pole # 38. A 20-foot wide entrance facing southeast, and a four-foot wide entrance facing southwest. It is about 100 yards east of West Shelter and showed some evidence of being inhabited. There was some guano on the floor and a small hole in the ceiling leading to a closed upper level.

SPIDER CANYON 7-MILE SHELTERS: Two shelter caves located seven miles up Spider Canyon in a small tributary canyon. One faced north and was never inhabited, the other across the canyon faced south and was rather large, measuring 30 feet long and 20 feet deep. A large 15-foot wide flat rock was in the center of the floor and was covered with two or three inches of dry dirt and ashes. A large midden deposit spread from the cave mouth down the hillside.

EL CITADEL SHELTER: In Hop Canyon two miles from the confluence with Reagon Canyon and on the left side at the base of large perpendicular rock pinnacles. A magnificent view of Hop Canyon can be seen from the cave. It is a small cave, but has blackened walls and ceiling. There is a small midden deposit in front.

JAVELINA SHELTER: By far the largest and best archaeological shelter found. It had shown long and continuous habitation by primitive Indians. Very large midden deposit in front of the cave, blackened ceiling, partial remains of crudely constructed fireplace, an excellently preserved grindstone or metate which had been used on both sides, several scrapers, arrowheads and spearpoints. Scientific excavation would probably reveal much more. The cave is 50 feet wide and about 40 feet deep with lowering ceiling toward the back. Seven miles up Hop Canyon.

LITTLE CANYON SHELTER: In a small tributary canyon not far from Javelina Shelter. Contains midden deposit and blackened walls and ceiling.

Little less important, but checked were other shelters: Hop Canyon: CRUMBEL, WIND, AND HAWK SHELTERS; Reagon Canyon: GREY and STEEP SHELTERS.

The only indication of large caves in the area was a lead on a sinkhole pit that was described as deeper than 30 feet. The lead was not followed up because of the miles of rough terrain that separated the cave from any semblance of a road.

DO YOU KNOW THE BASIC CAVING SAFETY RULES?
BIBLIOGRAPHY OF ARCHAEOLOGY AND VERTEBRATE PALEONTOLOGY IN THE CAVES OF TEXAS

Compiled by Ruben M. Frank

The following list of references was compiled from various existing bibliographies and with the help of friends and a slight knowledge of the literature. To my knowledge the paleontologic references include everything that has been published about the Vertebrate Paleontology of the Caves of Texas. The archeologic references, however, are by no means complete and the reader will undoubtedly know of many that are not included here.

To conserve space, the name of any publication that is referred to more than once is abbreviated. A list of the abbreviations follows:

AA - American Anthropologist
AAn - American Antiquity
BCTAS - Bulletin of the Central Texas Archaeological Society
BSAS - Bulletin of the National Speleological Society
BTAAPS - Bulletin of the Texas Archeological and Paleontological Society
BTAS - Bulletin of the Texas Archeological Society
BTMM - Bulletin of the Texas Memorial Museum
CTA - Central Texas Archeologist
EFNSI - Explorations and Field Work of the Smithsonian Institution
EP - El Palacio
NTMM - The Mustang, Newsletter of the Texas Memorial Museum
SN - Southwestern Naturalist
SFA - Student Papers in Anthropology, Department of Anthropology, University of Texas
TC - The Texas Caver
TJS - Texas Journal of Science
TSS - Texas Speleological Survey
UTP - University of Texas Publication
WMB - Witte Memorial Museum Bulletin
WTHSC - West Texas Historical and Scientific Society Circular

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NEWS

ABILENE:

Members of the grotto are looking forward to a meeting in the near future which has yet to be announced. There has been no meeting in the month of March, for many reasons, some of which are noted below.

The grotto has lost one of its finest members, Paxton Hutchison, who has accepted a position and schooling in the big city of Dallas at Data Processing, Inc. "Hutch" has been associated with the grotto now for almost two years and served recently as Treasurer. Bet that if he has the time, he will look up the Dallas-Fort Worth Grotto.

Mr. and Mrs. Bart Crisman are the proud parents of a fine baby boy. Congratulations you two on Kyle Mark Crisman.

George Gray has been busy lately with several activities (and more to come) A Junior Leaders Training Course (Scouts), Scout Leader's Training Sessions, and the building of a new home. (The predominant color? You guessed it—Grey brick.) Also George has been invited and has accepted an instructor's position at Wood badge training at Philmont Scout Ranch, N.M.

Jim Estes has recently returned from a week of vacation which he spent looking for caves and archeological sites in eastern Brewster Co., with his brother Jack from Fort Worth and Tom Meador of Eldorado.

An impromptu trip to San Saba Co. will probably be made in the near future.

Grotto address: 2818 S. 39th St. Abilene, Texas.

(Continued on next page)
rides again; new officers were elected at the January meeting and are striving for widely increased activities which will cover the whole range of interests of members with many divergent backgrounds. New chairman is Harvey Kohntz, photographer and archaeologist; Vice-chairman, Bill Gray, geologist and paleontologist; Secretary, Preston Knodell, University philosophy instructor and cave exploration enthusiast; Treasurer, Frenchy Barillet—stayed on in this job because the Grotto's funds are in his name in the bank—is a medical aid expert. New post of Research Chairman went to Orion Knox, Jr., architecture student who specializes in exploration and detail mapping. His colleague is David Gray who is preparator and curator of the many specimens now coming out of the caves for study and correlation.

Speleology being the scientific study of caves, we intend to do just that by all means at our disposal. We want to learn as much as possible about the origin and development of each cave through geologic history, its use and occupancy by Ice Age animals and Paleo-Americans and also the current faunal assemblage.

Grotto Address:
Preston G. Knodell, Jr.
231 E. Kings Hiway
San Antonio, Texas

Never climb rope hand-over-hand in caving!
This past month the SACSS has seen a good deal of action. Of several trips that were made (not including the Longhorn Cavern Trip - article elsewhere in this issue), the following are written up briefly:

Tuesday, March 6: A meeting was held and all enjoyed the Bustamante Slide series. Everyone was real impressed and it is hoped that the club can make a trip down that way as soon as school is out.

March 10: Seven members went to a cave east of Sonora on the Clarkson's Ranch. This cave is small, but very interesting. The one large room contains speleothems never before seen so abundant so near the entrance. The entire day was spent checking out crawleys and pits in the breakdown.

March 17: Wayne Jennings and Steve Wilson journeyed all the way to Austin to enjoy caving with some old buddies there. They went through Cave X, Steam Cave, and Hackberry Cave.

March 20: A meeting was held primarily for the purpose of organizing a trip to the Longhorn Caverns. Permission has been granted for the weekend of the 30 and 31st. Close to 100 per cent of the membership made the trip.

March 24th: Three members and visitors from the UTSS made a trip to Green Mountain Cave. Nothing accomplished further other than getting scratched.

Other activities included a campaign to raise money for the treasury. The Spelunkers (Intramural basketball team) placed third in regular play and will enter the playoffs for championship next week. April 5th will be a big day for some of the spelunkers here at SAC, as the club was asked to escort the Miss Wool of America Contestants through the Sonora Caverns... all of the members who were not 5', 9" or over, are somewhat bitter.

Club address:
Royce Ballinger
2412 Coleman Ave.
San Angelo, Texas

The grotto has been fairly active during the last month or so. Three successive week-end trips netted the exploration of an interesting and complex upper-level area in Natural Bridge Cave. The trips were led by Orion Knox, Jr., and included Mike Collins, Tommy Evans, James Reddell, Sharon Woolsey, John Bardgett, Barbara Madden, and others on one or more of the trips. A massive 18-man expedition to Indian Creek Cave was made on the weekend of March 31st. Numerous pictures were taken of the beautiful upper level rooms known as Alice's Wonderland as well as the water passages, a surface survey was made over the cave, a series of temperatures were taken in the cave and correlated with a recording thermograph at the entrance, water and rock samples were collected and an interesting joint-maze near the end was explored. Future trips are planned to map the joint-maze and contain temperature and fluorescein tests. On April 4th an all-night trip was made to Natural Bridge Cave in a driving thunderstorm by Orion Knox, James Reddell, Sharon Woolsey, and Leonard Hill to map a portion of the cave needed before the weekend of the 7th.

New officers of the grotto were elected. They are:
Philip Russell, Chairman
Mike Roe, Vice-Chairman
Sharon Woolsey, Secretary-Treas.
Tom White, Expedition Chairman
James Reddell, Research Chairman

Everyone is looking forward to Easter caving trips and the Board of Governor's Meeting shortly afterwards.

Crotto address:
Box 7672 U. T. Station
Austin 12, Texas

Congratulations should be extended Lee Skinner, Ft. Bliss for a very thought-provoking article written in the NSS NEWS entitled "Machine Processing Speleological Data." If you have not read this article, please do so, as it is very worthwhile. TSA claims Lee as a member during his stay in the army at El Paso.

(Independents please take note: We [THE CAVER] would like to receive more news on your activities. Thanks! -- Ed.)
ADDITIONAL CORRECTIONS TO MEMBERSHIP LIST, 1962
Texas Speleological Association

Additions:

333. Joe Sumbera
       Box 1028, Dickinson, Texas

334. Owens, Rex
       2125 Hackberry St., Pecos, Texas

The following should have (NSS) after their names:

70. Ballinger, Royce (NSS) (SACSS)
72. Jennings, Wayne (NSS) (SACSS)
232. Finch, Richard C. (NSS) (Ind.)

CAVE LIVING -- 7000 B.C.

Because the Amistad Dam is to flood many large and small archeological sites in Southwest Texas, the Archeological Salvage Program was begun in 1958 by Texas archeologists and the National Park Service.

In October, 1958, W. A. Davis, C. D. Tunnel, and J.F. Epstein of the University of Texas excavated two shelters, Damp Cave and Centipede Cave, perched high on a bluff overlooking the Rio Grande. The two sites were only slightly disturbed by relic collectors, allowing for good stratified cultural material.

The combined data that was received from both these caves revealed a human occupation that began about 7,000 B.C. and ending in the 16th century.

"The people who occupied Damp and Centipede Caves appear to have been nomadic, and to have eaten just about whatever grew in the eastern Trans-Pecos. The animal bones in the caves consisted largely of rats and rabbits, but there were also lizard and fish bones, clam shells, a few deer bones were recovered, but not enough to indicate that large mammals were either common or consumed often. Among the plants found in the fill, Lechuguilla, Sotol, and Prickly Pear were especially abundant. The impression gained from the refuse is that the people who lived here exploited their environment to the fullest. In this semi-desert region large animals have always been scarce, and it is necessary to eat almost everything in order to survive. The same general kind of existence has also been found in the American Southwest, and the term Desert Culture has been coined to describe it." (ESN, Vol. 8, No. 1)

(From an article appearing in Engineering-Science News, "The Amistad Dam Archeological Salvage Project" by Jeremiah Fain Epstein, Archeologist, Archeology Laboratory, Assistant Professor of Anthropology, The University of Texas.)

NEXT MONTH'S CAVER:

COMPLETE CONSTITUTION AND BY-LAWS OF THE TEXAS SPELEOLOGICAL ASSOCIATION.

NEWS OF THE SEMI-ANNUAL BOARD OF GOVERNORS MEETING OF T.S.A.
"BUILD A RAPPELLING SNAP-LINK", BY PETE LINDSLEY, DALLAS-FORT WORTH GROTTO.
CAVER OF THE MONTH, AN ARTICLE ABOUT A HARDWORKING TEXAS SPELUNKER.
AND EXCITING CAVE TRIP ARTICLES.
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James Redfield
Box 7072, U.T. Station
Austin 12, Texas