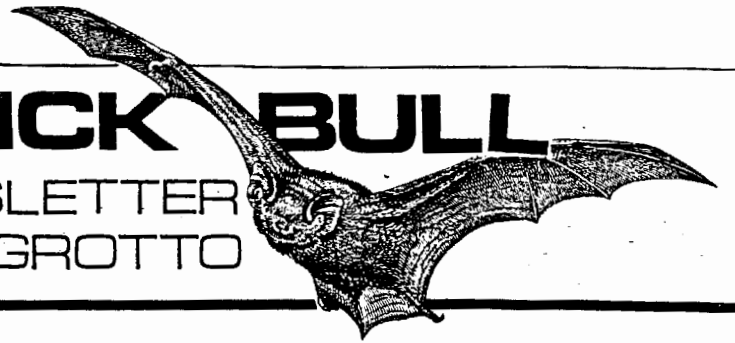


THE MAVERICK BULL

THE MONTHLY NEWSLETTER
OF THE MAVERICK GROTTTO



VOLUME 5 NUMBER 8

AUGUST 1990



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THE MAVERICK BULL is the monthly newsletter of THE MAVERICK GROTTO, an internal organization in the National Speleological Society (NSS 6-322). The editors invite all cavers to submit articles, news, maps, cartoons, art, and photographs. If the material is to be returned, a self-addressed, stamped envelope should accompany it. Items should be of interest to cavers and be non-political in nature.

Internal organizations of the National Speleological Society may reprint any item (unless copyrights belong to author as will be stated in byline) first appearing in **THE MAVERICK BULL**, if proper credit is given and a complete copy of the publication is delivered to THE MAVERICK GROTTO address at the time of publication. Other organizations should contact the grotto at the address herein.

EXCHANGES: THE MAVERICK GROTTO, will exchange newsletters with other grottos. Contact any officer.

COMPLIMENTARY NEWSLETTERS: THE MAVERICK GROTTO will provide complimentary newsletters to persons or organizations who provide cave access (i.e. landowners) or otherwise provide assistance to cavers. The Grotto will also provide three free issues to persons interested in becoming members.

MEMBERSHIP POLICY: Any caver with interests, beliefs, and actions consistent with the purposes of THE MAVERICK GROTTO and the National Speleological Society is eligible for membership. Acceptance of new members is based on payment of dues and a mandatory three trip requirement with at least three different grotto members. These three members shall act as sponsors. At least one sponsor must attend the meeting at which the membership vote is taken. A two-thirds majority vote of the members present will be required for acceptance.

MEETINGS: Meetings are held the second Tuesday of each month, at SMOKEY'S RIBS, 5300 East Lancaster, Fort Worth. It is a little less than one mile west of Loop 820 East and next door to a K Mart. The time is 7:00 P.M., and the food is good.

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CAVE RESCUE: Call Collect 512-686-0234

CALENDAR

Aug ?	The next Honey Creek Cave survey trip will take place this month. Contact Kurt Menking at (512) 824-7230 for details
Aug 14	Maverick Grotto Meeting
Sept 11	Maverick Grotto Meeting
Sept 15	Dedication of the Eckert James River Bat Cave Preserve
Sept 21-22	Big Manhole Digging Project
Sept 24-30	2nd International Speleological Congress in Monterrey, Mexico
Oct 9	Maverick Grotto Meeting
Oct 12-14	Texas Old-Timers Reunion
Oct 26-28	Continuation of the TSA survey project at Powell's Cave
Oct 19-21	Colorado Bend State Park Work Trip resumed after summer break

ON THE COVER

Our cover covers this month are Teresa White and Pooch Amy. Since Teresa became a flight attendant last April and was stationed in Miami, these newlyweds haven't seen much of each other. So we thought we could at least get them together on the cover of the Maverick Bull. They are pictured here in the Green Lake Room in Endless Cave on McKittrick Hill in New Mexico.

MINUTES OF THE JULY MEETING

The regular monthly meeting of the Maverick Grotto was held on Tuesday evening, 10 July 1990. Chairman Dale Ellison opened the meeting and introduced a first-time visitor, Ed Young. Ed has done a lot of hiking and rock-climbing, and was interested enough in caving to come to our meeting and subscribe to our newsletter.

After Dale read a list of upcoming caving events, an event from the recent past was announced. Russell Hill reported the arrival of a new caver to the community --- his new daughter Mariah! Congratulations to Cynthia and Russell on the new baby. (more details in this newsletter).

Plans are underway for another Joint Fall party with the D/FW Grotto. Donna Anderson is coordinating this and will have details at the next meeting. Right now we are shooting for the weekends of either 15-16 Sept or 22-23 Sept.

Butch Fralia is working with landowners in San Saba County to open up new properties for cavers. One of these, adjacent to the Otis Bristol place already has at least one known cave, Teresa's Hole. He asked for volunteers to help out with exploration when official permission is received to explore the new ranches.

After adjournment of the business meeting, Butch Fralia showed the long-awaited half-hour video program produced by the Texas Parks & Wildlife Department. They present a television series called "Made in Texas" on the state's natural heritage. This particular program, entitled "Down Under Texas" concentrated on the preservation of the underground wilderness of Texas. The program was slickly produced and well-received by the grotto members in attendance. Especially when local cavers popped up on the screen! Among the Maverick Cavers with speaking parts were Butch Fralia, Donna Anderson and David Finfrock. Butch said that Parks & Wildlife will be offering copies of the video for sale.

ANOTHER TEXAS CAVE PRESERVED

On Saturday, September 15, the new Eckert James River Bat Cave preserve will be dedicated. This home of five million bats is being protected by the Texas Nature Conservancy.

The dedication will include a fun filled afternoon on the James River in Mason County. That will be followed by a magical evening watching the bat flight. There will be a big picnic spread with plenty of cold drinks.

The bat cave is located near the town of Mason, northwest of Austin. For information and reservations, contact Sharon Reynolds of the Nature Conservancy at 512-224-8774.

MYSTIC CAVE PROJECT UPDATE
By Woodrow Thomas

The idea of completing a detailed survey of Mystic Cave, Murray County, Oklahoma was conceived as part of an independent study I did for a geology class earlier this year. After the dye trace was finished (see the July 1990 issue of the Maverick Bull) we continued to dig and survey in Mystic. Also, we followed up our investigations and mapping of four other caves in the immediate vicinity. (See the July 1990 issue of the Maverick Bull for a report on one of them). So far, nine survey trips to the area have yielded 4318 feet of mapped cave passages with all but 670 feet of that in Mystic Cave. Our digging efforts in Mystic Cave have yielded about 400 feet of downstream passage but progress in this direction has been stopped by a sump. At this date, survey is being conducted in the upstream section of the cave. Articles on the other caves in the area are forthcoming. When exploration is complete in Mystic, a final report with a finished map will be published.

Currently our landowner relations are good and we intend to keep it that way. Only survey trips are allowed and the number of cavers is being limited. Project participants have generally been chosen from members of the original survey teams. If you are interested in contributing your skills to the project and are fully competent in vertical work, wetsuit survey, digging and/or cave diving, contact me and I will consider you for inclusion in the next expedition to the area.

A NOTE FROM THE EDITORS

Not that we're complaining, but we were inundated this month with articles and trip reports from members of the Maverick Grotto. Thanks!!! But because of the volume, we simply couldn't squeeze it all into this one issue. If you sent us an article and you don't see it here, be sure that it will show up next month.

We appreciate all of your reports but even so, after a year and a half of editing the Maverick Bull, we are beginning to look for a replacement. Elections for Maverick Grotto officers for 1991 will be held in November. If you have access to a word processor, and would like to provide a valuable service to the grotto, talk to one of the officers.

A NEW CAVER
By Russell Hill

We are proud to announce the arrival of a new caver to our area. Mariah Lauren Hill was born July 4, 1990 to Cynthia Van Hooser-Hill and Russell Hill.

After a fairly quick nine months (editor's note: this is from the father) of expectations, which began with a phone call from S. Wales Caving Club G.B. (hello Russell, I'm pregnant) to a very quick, high speed drive at 3:00 am from our ranch near Springtown to Fort Worth (Wake up Russell, I'm having the baby), to an extremely quick 20 minutes in the birthing room, all natural of course. Mariah was born very healthy, weighing 3.36kg and was 50 cm long.

With a parental combination of over 34 years of caving interest, we think she might be some explorer. Congratulations to ourselves and thank you for your support.

1990 NSS CONVENTION

By Alvis Hill

Dawn and I decided to attend our first NSS national convention this year. Although it was all the way in Yreka, California (about 20 miles south of the Oregon border), we figured we could attend the convention, take in some sights, hopefully do some caving and celebrate our anniversary all at once. What a deal!

We flew out of Austin Friday, July 6 and landed in Sacramento. After meandering all day Saturday, Sunday found us at the Siskiyou Co. fairgrounds. We registered and proceeded to set up camp, which was situated in a grassy, if not shaded, area of the fairgrounds. Sunday evening featured an ice cream social which gave us an opportunity to mix with cavers from all over the place.

It didn't take long for the Texas cavers to search each other out. Those we ran into included Don Metzner, Dave Cave McClung, Jay Jordan and Sheila Knight from the DFW area. Joe Ivy, Linda Palit, Andy Grubbs, Doug Allen, Terry Raines, and George and Karen Veni hailed from points south. As often as not we found ourselves congregating around the campsite of Noble Stidham, a Lubbock Grotto caver. Noble likes to camp in style. He even has a microwave in his pickup!

Monday morning began with seminars. We attended a surveying workshop in the morning. The scheduled speaker was replaced at the last moment, and as a result the talk wasn't as organized as it could have been. Nevertheless, it was informative and I'm glad we went. The afternoon mapping workshop was much better. We were given an opportunity to plot a map from survey data given us, and one-on-one instruction from Pat Kambasis and Mike Goar was very helpful.

Monday evening was the Howdy Party, featuring barbeque and various brews. Although there was plenty of Howdy and plenty of Party, we were getting antsy. We hadn't been underground yet! Some inquiries produced directions to Pluto's Cave, only about 30 minutes away. We piled into our rented cavemobiles and took off. This hardy group consisted of Joe, Linda, Noble, Dave, Don, Dawn, an Oregon caver named Gary, and myself.

For several of us, Pluto's was the first lava tube we had ever entered. We soon discovered the properties of lava tubes:

1. They eat light
2. They eat clothes
3. They start looking alike

This particular cave had over 2,000 feet of passage, with high ceilings and large breakdown piles. In several areas the ceiling collapsed altogether, revealing the last glimpses of daylight through skylights above. Pluto's is also the local party cave, and is filled with all kinds of imaginative graffiti. After a couple of hours, we decided we had our fill and headed back to camp.

Tuesday, Dawn and I played hooky in order to take advantage of a field trip to Three Level Ice Cave. We drove about an hour and a half and met a group of California cavers at a rendezvous site in Shasta National Forest. The entrance was located near the road, and upon entering the cave we discovered that it sure enough had three levels and plenty of ice. At one point we found ourselves scooting across a small lake of solid ice, an eerie experience. We made our way through the cave to another entrance and exited into a huge breakdown collapse. We spent some time following the old lava flow, hopping into one collapse after another but finding no promising leads. After a while, Dawn and I took our leave and headed toward the Oregon border. We checked out Crater Lake that evening. The lake actually formed in a crater. At approximately 1500 feet, it is one of the deepest freshwater lakes in the world, and is the deepest shade of blue I have ever seen.

Wednesday, we headed for Lava Beds National Monument. We met Dave McClung, Doug Allen, and Don Metzner there about noon and proceeded to check out caves. Lava Beds is a unique national park facility in that it actually encourages visitors to check out its many lava tubes. They even pass out helmets and flashlights! Although you would expect to see a lot of wear and tear in the caves, they are actually very well-maintained and no vandalism was noted. We spent several hours going from one cave to another. Sentinel Cave was the largest. We worked our way into a lower passage and got excited because it was blowing like crazy. After following the passage for some time it played out and we lost our airflow. Don checked an upper lead but it didn't seem to go. We never did figure out what happened to the airflow. Another notable cave was Skull Cave, an ice cave with an entrance passage so huge it reminded you of something you might see in the Guads. Skull Cave was interesting because while crawling through some breakdown we found a small room which had a solid ice ceiling! We all agreed it was pretty strange. After a good day of caving, we all packed up and headed back to camp.

With our rabid caving urges somewhat satisfied, we settled back down to the business of convention-going. Dawn and I attended a seminar Thursday morning which dealt with orienting youth groups (Scouts, church groups etc.) to caving. Thursday afternoon we attended a vertical seminar led by David McClurg. The instructors were very helpful in working out some of the problems we had been experiencing with our vertical rigs. Thursday evening was the Photo Salon, featuring some excellent entries.

Friday, we saw more entries in the Photo Salon and viewed a presentation on sewerlunking in New York. (Really fascinating!) We also saw a spectacular slide presentation by a group of Romanian cavers, the only presentation of the whole week which brought a standing ovation. The grand finale of the week was Friday evening's awards banquet, the start of which was delayed due to the hot weather and lack of air conditioning. Once it got going, though, the food was excellent and the banquet was a lot of fun. Many cavers amused themselves by tying napkins together into a long napkin rope. I don't know how long the rope was, but I think it could have been used to drop Golondrinas!

Dawn and I decided to cheat Friday night and checked into a motel so we could get an early start Saturday morning. We drove down to Lake McCloud and saw our first bear in the wild. He wasn't too cooperative when it came to picture taking. We also found our only limestone karst of the week, a small cave opened when the road was cut. It contained a few nice formations and a pair of salamanders.

We checked into a motel Saturday evening, caught an early flight out Sunday morning, and the 1990 NSS convention was history.

Congratulations go to all the California grottos who helped put on the 1990 Convention. The convention was a great success and the Yreka locals were most congenial. We hope that some day we will be able to return to the area and do it justice with a serious caving trip.



CAVING IN LINCOLN NATIONAL FOREST
By Kevin Glover

Personnel: Chad Fenner, Tony Jones, James Morelan,
John Morrow, and Kevin Glover

Thursday afternoon Tony and I arrived at Chad's house on a hot and sunny 12th of July. July 12th is the birthday of a good friend of mine by the name of Jeff Sprinser. I have known him for more than 15 years, so happy birthday Jeff!, wherever you are. We loaded my car and waited for John and James. They were there by the evening and we left Ft. Worth around 7pm. We took my car and John's 4x4 truck. The permits for our caves had not been mailed back to Chad due to someone at the Forest Service forgetting to put a postage stamp on the return letter. So we were going to pick them up Friday morning after 8am at the ranger's station by Queen's highway inside the forest.

We drove late into the night and arrived at the ranger station about 4am and set up a lazy version of a camp. The sun woke us up around 8 and we got our permits and headed for the hills. Three Mile Hill is a long set of ridges that go off in several directions and has some very rough jeep trails running over it. We set up camp somewhere on top of the ridge. We took the 4x4 down the roads to find that day's cave. Chad and John would sit in the seats in front and the rest of us had to stand up in the back while John roared over the roads about 30 mph. Remember, these are jeep trails with rocks everywhere. We were holding on for life and loving every minute. I was nearly bounced out of the truck and when John hit the water puddles we all learned to duck. John would slow down to roll over large rocks and we'd all take a breath and then someone would yell "faster".

We were on the ridge top and Three Fingers Cave was nearly at the bottom of the hill we walked down. The entrance is a small hole in the side of a cliff about 4 feet high and 3 feet wide. Once inside you crawl 10 feet to the right and you are looking over the first section (30 feet) of a 150 foot drop. At the first ledge is 10 feet of walkspace going to the rest of the vertical pit. At this level there is also a crawlway. Halfway down the 120 foot section is another level and a ledge, but we did not look at those. This is a really large cave full of pits and big rooms and mazes. Much of it slopes steeply down or drops off into a pit. This is a definite vertical cave. From the surface we probably descended 500 feet below the entrance, most of this being climbing. We used our ropes in the upper passages over the long drop and as handlines and then went climbing down over breakdown until we got to another living section of the cave and found a 30 foot pit which we had no rope for. We went back up tho the room we had originally dropped into from the surface and looked around. This was a large room with a high ceiling (100 feet) with many huge boulders around it that fell from the ceiling and then were covered with calcite. It was rather like climbing through a wet, slick junk pile. Due to all the climbing, we were tired after about four hours and so took a few pictures and ascended out. We went back to camp (way up the hill). During our stay, there was only a hint of the hot summer usually there. We got rained on twice. Personally, I want to go back to Three Fingers Cave and look at all I missed and drop down all the pits and see how deep it goes. I understand that there used to be a survey project going on there and that they left to go survey the larger Lechugilla Cave. Some of Three Fingers is unsurveyed.

The next morning we were up rather early and ready to hit the caves. We had permits for Hell Below and Hidden Caves. So, going through the same routine of "hit the rocks and hold on for your life", we reached the area where we were to park and walked less than 1/4 mile to find Hell Below Cave. The entrance is a crawl which open up to walking passage going one way. It slopes down (sometimes steeply) for 50 yards until it comes to a long, tall room that reminds one of a crack. It's probably 100 feet tall and long but only 2 to 4 feet wide. We rigged a rope to drop 30 feet to the bottom. The corridor turns back in the direction we came and below where we were and goes through a 20 foot crawlway which opens up near the ceiling of a large corridor. When you reach the end of the crawl there is no place to stand up for you are looking down a 100 foot drop.

Cavers from long ago left spikes in the wall in various places to rig rope for the drop. There is a small crack in the floor just before it drops away and if the rope should get stuck here you cannot ascend back out. The cavers from the past also rigged spikes on a wall extending out over this 100 foot drop. All you have to do is clip carabiners onto these spikes and run the rope through them so you avoid the crack in the floor. Then all you have to do is reach out, grab the rope, connect yourself to the rope and chimney out to where the rope hangs down. To make this even better, the whole area is slick with water and there is only one good foothold. On the descent, 20 feet of it is against a smooth wall which ends with 80 feet of free hang to the floor. At the bottom the huge corridor goes in two directions. Both ways are immediate drops of no less than 20 feet. We went one way that was close enough to extend the rope we just got off of over the drop and continued only for a short distance where we met more pits. There was no more rope and so we were stuck.

After some picture taking, we ascended back out and most of us vowed to come back with more rope, alot more rope. There was a log sheet near the entrance, so we signed it and left some smart-ass remarks and walked back to the truck. We went back to camp and ate some lunch and lazed around about an hour. Everyone was tired from the vertical work in Hell Below. Later on we drove to Hidden Cave. Four of the five of us have been to this cave before, but we like it enough to come back again. The entrance is a crack about 30 feet long, 5 feet wide and 50 feet down to the upper level. A few feet off in one direction is the second drop of 30 feet to the lower level. On the whole this is a cave to walk easily through. There are some low ceilings in some places and some steep climbs but it is a basically easy cave to go into. In the lower tunnels there is a large room with 100 foot high ceilings. The cave is well decorated everywhere and in the target room there are stalagmites reaching 40 or 50 feet high and sometimes just as wide. There is not much work to this cave except for the entrance drops. Chad has a picture of one are of the largest room on the cover of one of the recent Oztotl Cavers. We stayed a long time and Tony and John left about 9pm while we three looked around some more. James, Chad and I ascended out about 11pm. My head light batteries went dead while I was coming out the entrance and I required light from above in order to see anything. Starlight from above was obscured by clouds. Several months ago, a Carlsbad Caverns Park Ranger educated me about electric lights. She said, "If batteries are going to go dead, they will do it while you're on rope". She told me she had to ascend out of Ogle Cave by starlight once due to dead batteries. We were all pretty damn tired and we all staggered up the hill back to the truck. It was raining that night and we went back to a wet camp. Nevertheless, I slept as if in a grave.

Sunday mornin we woke and packed up the camp and began our exit. I got to drive my car through all the rain pools and mud. I did rather well, only getting near to stuck once. On our way out we walked out to our last cave. Cottonwood Cave is an extremely large cave. The entrance is shaped like Carlsbad Cave entrance and is about the same size. The entrance slopes down over much breakdown to a flat floor. We had a permit to the upper level only and I cannot say what was beyond the small gate in the back of the cave. The upper passage was not small in any way. In some places the ceiling was probably 200 feet high. The walls were at least 100 feet apart. The floor formations were likewise enormous. We saw a stalagmite that was 40 feet wide and probably 80 or more feet high. The upper level is one large corridor and in back slopes steeply down about 100 feet vertically to an alcove containing the gate to the lower passageways. Generally the blue light from the entrance can be seen.

After we exited and made it back to the vehicles we drove down the mountain and headed homeward. We left the mountain around 11am and went to Carlsbad and ate at a Mexican restaurant called Lucy's. The food is excellent. I think Chad was the one saying that everytime he is in Carlsbad he makes it a point to eat there. We got back to Fort Worth around 10pm and we all lived to tell the story.

Destination: The Lost World Expedition in Yalijux Guatemala
Date: April 1-12 1990, March and April for the Expedition
Personnel: Danny Sherrod, Steve Knutson, Peter Haberland, Matt Oliphant, Mark Harder, Ernie Garza, Ian McKinsey, Randy Spahl, Pete Shifflett, and Carol Conroy
Organized by: Steve Knutson
Reported by: Danny Sherrod

"Danny Sherrod?" "How did you recognize me?" With that much stuff you must be a caver." Thus with this introduction Steve Knutson the leader of the Lost World Expedition and I met at the Guatemala Airport. After meeting another caver we then travelled to Antigua to restock and to meet with other cavers tha would be travelling with us to village of Yalijux where we would be caving.

While in Antigua we we saw some of the Easter celebrations. Easter is the biggest Holiday in Central America with many of the locals participating in parades. The parades have bands, people dressed as Roman Solders and huge wooden "floats" which are carried by perhaps 50 people for the largest float.

Also, while walking though the town at night a group of solders with automatic weapons passed us. While they did no harm to us it did remind us that we were in a very different place than at home. We later saw solders on rooftops and other places in town but they never bothered us and would give directions freely when asked.

After spending 3 nights in Antigua, we traveled to Yalijux in four wheel drive truck we rented. The last 15 or so miles were up a foot trail that seldom had even four wheel drive traffic. We passed over a bridge whose predecessor had been blown up by Rebels in the early 80's. The bridge had only been recently rebuilt and rebuilt in a very fragile way. Many of us were wondering if it would last the crossing. Later in Yalijux the truck fell into a small hole which required us to get out and push much to the amusement of the locals who came to watch.

Yalijux is a small village built by the government for the local people that were displaced during the conflict with the Rebels. This village had running water but no sewage system. A few walkup stores with very limited supplies and a market twice a week. No televisions existed but they did have a few radios. The village also had a school and two churches. However, it did not have electricity, telephone or postal service.

Most of the buildings had grass or sheet metal roofs and they were made of stone and dirt or sticks. The floors were dirt and their fire was made in the center of the floor with the smoke going out through the roof. After sundown almost no light could be seen since few people had light.

The town had two Futball fields where the boys played when they were not in school and the men played on market days and after church on Sundays. The men took the game seriously and they all had the proper shoes and uniform although they had few other positions.

All the chickens, turkeys, hogs, and dogs ran free. The noise from all the animals was very loud and took some of the group a few days to get where it did not interrupt their sleep.

They had no horses or other animals to use for transportation. All loads were carried by the people. Even when they logged the area a few years before they carried the logs out by hand.

Since we sent the truck back to Guatemala City we walked to all the caves and to ridge walk. We had planned to use locals for Sherpas however they were planting their fields and were uninterested so we carried our own gear up the mountain to the caves.

The first cave I went into was discovered earlier the month before. I was on the third trip into the cave. The previous trips ended at drops. We also ran out of rope one drop 21 meters before the bottom of the cave. The cave ended up being 270 meters deep, the third deepest cave in the area. The cave is mostly vertical with a very large pit entrance. Like most caves of the area I saw decoration was limited. The cave had birds that lived in the walls of the caves. These birds would attack some but not all cavers on

ORIGINS AND REMOVAL OF CARBON DIOXIDE COLORADO BEND STATE PARK

By Rafal Kedzierski

Carbon dioxide not only creates and decorates limestone caves but also guards them. "Bad air" in caves, its detection and effect on the human body, has been recently described ("More Bad Air", Butch Fralia, Maverick Bull, February 1990. In this article, sources of CO₂ and factors that may influence its removal are discussed.

Sources of CO₂

Carbon dioxide can be created in caves by decomposition of organic material (endogenous CO₂) or brought into caves with water (exogenous CO₂).

Exogenous CO₂

Caves with exogenous CO₂ should be recognized because they create a potential hazard to cavers. In such caves several methods that are used to detect "bad air" (such as an oxygen meter, butane lighter or carbide lamp) are misleading. High concentrations of O₂ (19%) that can very well support the flame of a butane lighter, can be accompanied by lethal CO₂ contents (10%).

Exogenous CO₂ is carried into caves by water that flows through either soil rich in CO₂ from decomposition reactions or underground water channels filled with mainly CO₂. When water containing dissolved CO₂ and bicarbonate salts reaches the cave, it releases carried CO₂. Gases in cave atmosphere are replaced by released CO₂. Nitrogen, however, is replaced in four times higher amounts than O₂. Thus, the sum of concentrations of CO₂ and O₂ in an exogenous CO₂ cave atmosphere is always higher than 21%.

In Colorado Bend State Park, Gorman Falls Cave is a good example of an exogenous CO₂ cave. This cave, which usually contains very high CO₂ concentrations, also possesses an underground stream that drains many other karst features in the area.

Endogenous CO₂

Decomposition of organic material brought into caves by water or animals creates endogenous CO₂. Organic material consists mainly of organic debris (leaves), topsoil (humus), animal remains and bat guano. Decomposition reactions use up oxygen, releasing the same volume of CO₂ if plant debris (mostly polysaccharides) is decomposed or slightly smaller volume if animal remains (mostly proteins and fat) are decomposed. In such caves the amount of O₂ and CO₂ is 21% or less.

In caves containing endogenous CO₂ the measurement of oxygen level, the use of an oxygen meter, carbide lamp or butane lighter is sufficient to prove whether the cave is safe to enter.

In Colorado Bend State Park most caves contain endogenous CO₂. Such caves as Blue Ribbon Pit, Lemon's Ranch Cave, Parsley's Pit and Big Bad Air Hole contain significantly decreased oxygen level and they also intake huge amounts of organic material.

As a part of an ongoing project at Colorado Bend State Park, it would be important for the safety of all visitors to have the caves classified on the basis of CO₂ origins. We have to consider, however, that some caves, for example Big Gorman, can contain endogenous CO₂ as well as exogenous CO₂. This will also be influenced by weather and season.

Factors Influencing Removal of CO₂ from Caves

Temperature

Theoretically, cold air from above ground (50°F or less, correspondent to 10°C or less, 1.25g/L density) can replace cave air containing 5% CO₂ (68°F or 20°C, 1.24g/L density). However, cold air entering caves warms up instantly and can't practically replace the atmosphere inside a longer cave.

Pressure

Changes in atmospheric pressure range usually within approximately 20mm Hg from its 750mm Hg normal. Thus, the pressure varies about 3%. Therefore only about 3% of the air capacity at the cave entrance can be exchanged in such a way. Pressure has minimal, if any, effect on removing CO₂ from caves.

Water

Water can dissolve considerable amounts of CO₂ contained in cave air. At 68 F (20 C) at normal atmospheric pressure the same amount of CO₂ (expressed in g/L) is found in the water as in the air. In the presence of limestone, however, water absorbs much more CO₂ because dissolved CO₂ reacts with limestone creating calcium bicarbonate and allowing more CO₂ to enter the water. In this way, if water flows out of the cave in the form of a spring, it can carry away huge amounts of CO₂.

On the basis of this mechanism, I assume that water is the main factor in decreasing the CO₂ content in the atmosphere of many caves. To prove this hypothesis, the correlation of the CO₂ content in a cave and rainfall should be studied more carefully.

Ellenburger Limestone

Ellenburger limestone is a very hard non-porous limestone that is not easily penetrated by water. Therefore, CO₂ in caves created in such limestone can't be efficiently washed away by water. This is probably the reason many caves in Colorado Bend State Park, which are formed in Ellenburger limestone, keep a relatively high CO₂ content almost year round.

Forecasting of CO₂

High amounts of CO₂ can be found in a cave with the following conditions: a) little water intake, b) containing decomposing material, d) after a dry season, d) in hard limestone, and e) with poor ventilation.

If water is truly the main factor removing CO₂ from a cave's atmosphere, you might expect a significant decrease in the CO₂ content after a big rainfall. This was the case during last spring's rains, when all the caves in Colorado Bend State Park contained less CO₂ than ever, and could easily be visited. When dry season begins, the CO₂ increases because not only is CO₂ not removed anymore by water but also, any underground lakes that dry up return the CO₂ they had absorbed.

HARRELL'S CAVE REVISITED

by Butch Fralia

Destination: Harrell's Cave and others.
Trip Date: June 1934 through tomorrow
Personnel: See TSA mailing list, See TSS files on Harrell's Cave.

How do you write a story like this and do it justice? How do you write a story fifty-six years old and fifty-six years long? To those who participated, it is one of those magnificent experiences which deserve more than, "we met at Denny's and then went caving." There are twenty-six pages of type written notes transcribed from magnetic tape and at least a thousand pages still blowing in the winds of time. There are twenty-six pages of answers which create so many questions that more tape and more notes will surely be necessary. It's the history of a cave, an area, and an interesting man.

If you don't see the paper, hear the stories, see the old clippings and photographs, it's easy to believe this story started May 12, 1990, in Bend, Texas. A group of cavers are asked to be diplomats and show a local resident Gorman Cave, a cave the man had never seen. This could be important we're told, this man knows a lot of people and could possibly open a lot of caves. He discovered Harrell's cave, the first man in it and he knows a lot about caving.

At 8:00 P.M. we get our first glimpse of John Ben Howell who will be 74 years old next birthday. Ellen Allen, Keith Heuss and I are to be tour guides and of course there is a question in our minds of this man walking down and back up the hill, much less going all the way to Gorman, then touring the cave and coming back. John Howell, has an aspen stick, sturdy boots, adequate lighting and is ready to go. Which of us will deny this man the opportunity to see Gorman Cave?

We load into a vehicle and drive to the nearest point, the upper Gold Mine. You say there are other and even better routes but the Colorado River has just dropped below flood stage. At the Upper Gold Mine we park and begin the walk down a steep hill. The River is still high and so is the mud. We walk through wet grass and slimy mud, across creek bottoms turned quicksand. The creek at the cave entrance is full, bottom mud measured in feet, but we cross and climb up and around, down the steep slope and finally reach the cave entrance.

John Howell, smokes a cigarette and explains he's not as agile as he used to be but he's still sure and steady. He made the climb up and then climbed down the even steeper slope to the entrance, we begin to relax. He'll make it for sure we tell ourselves and wonder if we'll be in such good shape at his age.

Inside the cave there's a low ceiling and a pool of water, we take the long crawl around and up into the cave. We tour and come to the graffiti room where John knows many of the people who's names are in the cave. M.E. Millican, an old running mate and other names of local interest. He goes back to separation lake which is flooded and decides it's time to return. At the entrance we take a short rest then begin the trek back.

We're tired, we've been caving all day and the trip back seems even longer than when we came down. John is exuberant and happy, alive. He's never seen this cave in all the years he's lived in this area. Originally born in Georgetown, Texas, he found himself in San Saba, County when his father was foreman at first one ranch then another until they settled in Chappell in 1923. He's excited and goes up the hill perhaps a bit slow but steadier than the rest of us. It's that aspen walking stick! We think to ourselves, got to get one of those.

Back at camp we talk for a long time, cavers who didn't have time for the tour have suddenly discovered John Ben Howell. He meets Pat Copeland from Brownwood and learns of many caves on the West side of the county. Some of these caves are familiar and those he hasn't seen he's heard about. Everyone is interested in John and he in them. After a time, people drift away and John wants to set up a trip to Harrell's Cave, next month, before he returns to Colorado. John moved to Colorado '59 to become a civilian instructor in Air Force Schools. He's retired now, owns two houses at Chappell and two in Colorado. He has a house in town where some of his kids live and a mountain cabin at 9500 feet where he and his wife Jackie live when they're in Colorado. They (John and Jackie) built the mountain cabin after he retired and according to John are still building on it. He's in good shape from walking the mountains, while we hike the flatlands. They live in Texas during the winter months and Colorado during the summer while it's hot in Texas.

Talk continues for a time about going to Harrell's the next month and perhaps we can rig some way for the land owner, the old Doctor, Doctor Bentley to get down, John will figure some way to get himself down. Talk continues for a time then John decides he's keeping these tired young people up and heads back to the ranch.

In June, a few days before the trip, John calls early in the morning. "Are you still coming down?" He asks excitedly, "I'm trying to get some cable ladder together from some folks over in Temple and before I go, I thought I'd make sure you was still a comin'."

We're coming, wouldn't miss it for the world. I've wanted to do Harrell's cave for a long time.

Time passes and the big day arrives. You're there on an old dirt road leading out from Chappell, in fact the only dirt road leading out from Chappell. About two miles, look for John's pickup and as soon as it's spotted, John and Jackie are on the road waving us down, showing the best parking places. Ellen and Sean Allen, Kathy Chauvin, Terry Free, Keith Heuss and me. John has built a rope ladder, a very well constructed rope ladder. The poor old Doctor whom we learn is a few years younger than John once had spinal meningitis and has recurring headaches and other symptoms. One looks at the rope ladder and the dark entrance some forty-five foot deep and wonders if the sight of this, hasn't brought about a relapse.

It's a great entrance, when he couldn't get a ladder from Temple, John spent two days making his ladder then he and Jackie have spent another two days including several hours this morning, working in the hot hill country sun, clearing brush from the entrance. About a hundred feet past the fence, over which a ladder is placed for this trip, lies the entrance. Jackie has told us that for nearly a year John has lived for this day, he decided he'd return to Harrell's Cave but it would take help from people who knew caves. Jackie read in the local paper about a group of people who were doing research on local caves and started asking questions around the Bend Store. Shortly, connections were made and cavers were asked to take John caving in Big Gorman. "He's lived for this day a long time and if he dies after he comes out, his life will be complete." This brings a few shudders but John will make it.

Keith Heuss (who's been to Harrell's Cave) and Kathy Chauvin rig a rope to check out the entrance while the rest of us sit around and let John tell us about how and when he discovered the cave.

He lived in Chappell and explored a number of caves in the area. He was an early explorer of Fence Line Fissure and other caves on the Bristor property. In 1934, he discovered Harrell's Cave. The owner, George Harrell, asked John to enter the cave and search for water. The first time he went in, he used a rope ladder. There was a large rock over the entrance with just enough room to one side for

a skinny young man to get through. The opening was situated so the rope ladder hung down perfectly along the wall. Young John descended and was gone for several hours causing George Harrell to become concerned. Meanwhile in the cave, John found the skeleton of a bear and bear tracks which looked so fresh they could have been made yesterday. There was the track of a snake in a dry part of the cave. He found water but not enough to justify the expense of drilling a well and putting up a windmill. Later, they came back and used dynamite to remove the entrance rock exposing a hole about six feet by eight feet. This was in 1934 through 1936 and John is coming back today, for the first time in fifty-four years.

We sat for a time swapping tales while John hand rolled the cigarettes he smoked. Keith and I brought tape recorders fully intending to collect every story we could. Much of what we learned from John and Jackie Howell, ties in with other stories, fills in missing gaps and provides us a better picture of the area. John had once worked building the road to the Lemon's Fishing Camp on what's now Colorado Bend State Park. This was before the Lemons came to this part of the country and the man who had the road built was Mike Chisholm, a relative of Jesse Chisholm founder of the famous Chisholm Trail. He later bought property up river with a big cave and water fall and opened it as a fishing camp, this before Charles McLarrin. We are referred to other people who would gladly spend hours talking about the history from this part of San Saba County.

It's time to go in now, John fires up a Coleman lantern, and gets ready to descend the ladder. He says in the early days they used carbide lamps. When possible, he prefers the Coleman, it brings out color in the rocks. Keith has him on belay while I rappell down alongside in case there's trouble. I see John's doing fine and I rappell on to the floor and hold the rope steady. John asks for his lantern, water bottle and aspen stick to be sent down. Once received, he's off exploring the cave while others come down. Ellen and Sean are doing their first rappell using figure eights.

When all have entered, John begins to show the cave. Harrell's is mostly one big room with huge breakdown blocks covering a large part of the floor. The ceilings are high and a small bat population resides there. They are gone now but we see where the bear bones once lay and where the bear tracks have been walked over by careless explorers. Bear skeleton and tracks found at a time when the oldtimers said there hadn't been bears in this part of the country in seventy-five years. In John's eyes, the cave has indeed changed over the fifty-four years, there are now piles of guano where before there were no bats. The huge breakdown blocks, once white and clean are now covered by slick, slick, guano. The cave has changed, there were formations taken out, soda straws gone. John is clearly distressed by what he sees.

To one side of the cave, we see a hole in the floor where John used black powder to open a crack. This leads into several lower rooms which are small and lead to water.

Part of Harrell's cave has beautiful formations and to one side a long flowstone stuns the mind with it's beauty. Climbing the flow stone you enter passage through a tight crawl which John, in his early explorations, opened by chiseling away part of a rock to enlarge the opening. Keith and Kathy explore to the end. There's an 18 inch water fall in there in a formation passage which alternates from belly crawl to walking passage and back again. This is one of the most beautiful parts of the cave.

There's a small lake along one side the big room, the water is crystal clear with a slightly greenish tint, it's one of those pools which can be a few inches to a hundred feet deep. On this day, no one will disturb the clarity of the water to find out. It looks as though the water goes back into what could be a submarine passage or

just a deep shelf. Beside the lake sits a large white flowstone which is easily larger than Inner Space Cavern's flowstone of time. There are small passages leading off the flowstone above the lake but these aren't to be explored today.

Harrell's is unusual for San Saba County, where we grow to expect small tight squeezes, it's a large room with tall ceilings. There are formations and bats, with it's vertical entrance it's everything a caver could want even if it is only 500' long including the crawls. The cave gives the impression of being much larger than the map shows it to be.

In time, everyone returns to the entrance and climbs back to the surface either by John's ladder or ascending gear on Keith's rope. For a time, we rest before gathering equipment. John thinks the cave is worth the effort and he's glad he came, though he did say the only way he'd return was when the elevator was installed.

It was a marvelous day, we think of caves and the great ages it takes to form them. We think in terms of geological ages yet in the comparative eye blink of fifty-four years there have been changes brought on by both man and nature. It's a fascinating experience to see a cave and the surrounding country through eyes such as those of John and Jackie Howell. Though Jackie didn't enter the cave, she provided a great wealth of information about the local area and local people.

John and Jackie are in Colorado for now but one day they'll return. I only hope the telling does justice to the event because those of us who were involved will never forget the day we went caving with John Ben Howell.

