

## The Discovery of Inner Space Caverns

A personal account by James W. Sansom, Jr., Texas Highway Department Geologist

Famous last words: "Take care for you might encounter some caves while drilling this location."

In the spring of 1963 when I was employed as the Geologist for the Bridge Division of the Texas Highway Department (THD), one of the THD's Core Drill Crews drilled into a large cavern south of Georgetown, TX. My responsibilities as geologist included providing a geological perspective of the foundation conditions at proposed bridge sites to design engineers. This work entailed coordinating core drilling exploration, the overseeing of the quality of logging data from core holes, and geotechnical testing.

THD District 14 Headquarters located in Austin, Texas had requested a drill rig to begin exploration core drilling for the bridges and overpasses for the Interstate Highway 35 bypass of the City of Georgetown. Upon my examination of their proposed route, the first overpass south of Georgetown would cross the Balcones Fault Zone. It would go over a frontage road and the Georgetown Railroad tracks. When I talked to Sylvan Turner, Core Driller, I suggested that he be cautious in drilling this site because he might encounter some voids and caves. This procedure consists of the drillers having to maintain tension on the steel cable that raises and lowers the drill kelly on this rig. If slack in the cable is not maintained, the drill bit will drop suddenly when a void is encountered and will sometimes cause damage to the bit or it can get stuck in the hole. Sylvan, being one of many drillers for whom I had worked in the summers while attending the University of Texas in pursuit of my Geology degree, didn't take me seriously. I was a young green-behind-the-ears geologist and what does a 'college boy' like me know about anything! As it turns out, I was fortunate to work during the summers as an assistant core driller for core drillers that taught me much about life.

Sylvan Turner obviously did not listen to me. When I heard about his having drilled into a large cavern, he had already lost a 10-foot section of his drill pipe with an attached 6-inch-diameter roller rock bit. His bit had dropped approximately 25 feet from where he drilled into the roof of the cavern to the floor of a large room. His bit had broken through some flowstone where it locked up. He was not able to recover it and ultimately twisted it off. He maintained correct tension on his kelly cable following this experience because he drilled several additional holes into the same large room, which is now called Outer Cathedral [Discovery Room] by the Inner Space Cavern owners.

Upon completion of the core drilling, a 24-inch-diameter hole was drilled into the cavern so THD personnel could map the extent and conditions of the cavern relative to foundations for the planned overpass. The 24-inch hole was drilled with an auger rig by Jim Cole of District 14. Upon notification that the hole was complete, Jack Bigham, Bill Schultz, and Lawrence Schultz, Horace Hoy, and I were lowered down through the 24-inch hole by a makeshift stirrup on the end of the kelly of the auger rig. Jack Bigham was the first to enter the cavern. When I was lowered into the cavern, I saw the drill pipe that Sylvan Turner had twisted off into the floor of the cavern. I recovered the drill pipe and bit and returned them to Sylvan to his surprise.

We explored the more accessible portions of the cavern and were surprised of its size and noticed that the air was stagnant because smoke from a match did not disperse readily and floated aimlessly in space. We had drilled into a cavern that had been undisturbed for some time and had only minimal openings to the outside.

District 14 personnel surveyed the cavern and mapped the major portion of it that was underneath the proposed overpass. I accompanied the survey crew. Some of the open core holes that were drilled into the original cavern room were utilized during our survey. We dropped light cords down the holes and illuminated the cavern during our survey. We spent several days in the cavern and found out early on that there was a shortage of oxygen in the cavern; therefore, we would only work short periods of time before returning to the surface.

During the following months numerous people entered the cavern for various reasons. Local members of the Texas Speleological Association mapped the cavern. Bill Russell and others mapped much more of the cavern than is presently open to the public. On several occasions I explored the cavern with spelunkers and paleontologists. Dr. Bob Slaughter of Southern Methodist University and Dr. Ernest Lundelius of the University of Texas visited the cavern.

One of my trips with some of the local spelunkers was on a particularly cold day in winter when the temperature outside was between 30 and 40 degrees Fahrenheit (F). The spelunkers utilized a chain ladder to descend into the cavern through the vertical 24-inch entrance hole. We went into the cavern one Saturday morning and came out late that afternoon. Going down the chain ladder was not a problem for my boots were dry and I was fresh when I was descending into the warm cavern. Exploring the cavern we got sweaty due to its constant humid 72 degrees F. temperature and muddy from the very slick red mud that is common to Edwards formation caves. In the late afternoon when we decided to leave, I realized that I had a problem that no one else did in getting out of the cave. In order for me to climb from one chain ladder step to another (about 18 inches), I had to raise my leg to a horizontal position. To make a long story short, my 27-inch leg would not fit into a 24-inch-diameter hole; therefore, I had no choice but to chin myself up each step of the 33.5-foot hole so my muddy feet could slip into the next moving step of the chain ladder. With the cold air descending down the hole onto my sweaty body and the cheers from the spelunkers above, I somehow made it to the top. The experience was unforgettable.

The spelunkers were a big benefit to the THD by mapping the cavern for overpass design purposes. The engineers of the Bridge Division and District 14 felt that the 33.5 feet of competent limestone that occurs between the surface and the cavern was adequate to support the planned overpass. Also, the mapping that the spelunkers did was helpful to Dr. William W. Laubach, the landowner, who later developed the cavern into what is now known as Inner Space Cavern.

Dr. Laubach asked and received permission from the THD to develop the cavern beneath Interstate 35. He accessed the cavern by excavating an artificial opening outside and adjacent to highway right-of-way. During construction of the cavern development, the original 24-inch core hole drilled by THD was used as an air vent. The construction of the overpass of Interstate Highway 35 covered the vent. Inner Space Cavern opened officially in June 1966 and had its 25<sup>th</sup> anniversary June 1991. It is reported to have had close to one million visitors during this time.

## SOME GEOLOGICAL OBSERVATIONS ABOUT THE CAVERN

When I was lowered down the 24-inch drill hole to the cavern I observed that from the top of the ground to an unmeasured distance down the hole the limestone bedrock had the characteristics of the Georgetown formation. The remaining portion of the 33.5-foot hole and cavern area are within the Edwards formation. The upper section of the hole was a dry chalk-white nodular limestone of uniform lithology. Immediately below this, the lithology abruptly changed to a honeycombed, cherty, massive, dolomitic limestone with water flowing out of the honeycombed opening and down the wall of the core hole and dripping into the cavern below. Inside the cavern I observed numerous nodules and discontinuous beds of chert that are exposed. There are some places in the cavern where fossiliferous limestone beds resemble coquina. Much of the cavern is stained with various shades of red, iron oxide, and the floor is covered with red mud and in places with bat guano.

Paleontologists Drs. Bill Slaughter and Ernest Lundelius identified numerous extinct vertebrates. Some of those identified were peccary, mammoth, camel, dire wolf, horse, bat rabbit, prairie dog, and saber-toothed tiger. There are several closed collapsed sinks identified by the spelunkers' mapping that were most likely natural openings at some time in the past for many of the bones were found in these areas.

Structurally the cavern is within the Balcones Fault Zone that has a general strike of North 15 to 25 degrees East in the area of the cavern. The cavern map reflects this primary strike as well as additional secondary cross faulting and jointing.