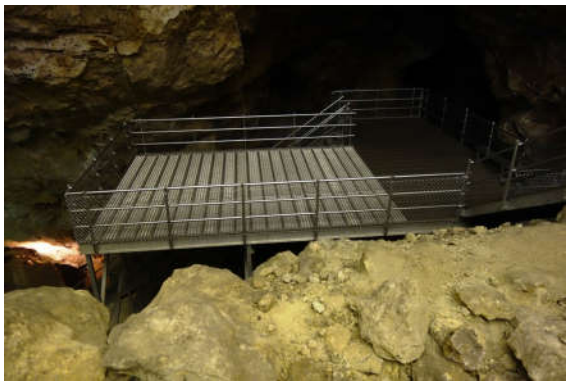
A Brief Tour of Jewel Cave

Jewel Cave started as an inland sea about 350 million years ago, long before the dinosaurs. The entire area from Canada to Mexico was a shallow, tropical, inland sea. As animals with shells died, a layer of calcium formed on the bottom of the sea. After about 10 million years, there was a 250 foot layer of limestone at the bottom of the sea. The sea briefly left and then returned. Dirt, sand, and clay were deposited on bottom of the sea. This formed an impermeable layer on top of the limestone. About 40 to 65 million years ago, (after the dinosaurs died out and before the mammoths came), plate movements forced granite to move up, breaking through the limestone and cap layers, forming the Black Hills. At the end of this period, the limestone was laying at an angle on the sides of the mountain with many cracks. Water entered the cracks. The water picked up carbon from the CO_2 in the atmosphere, and also from carbon in the ground; making carbonic acid. The carbonic acid dissolved the limestone, making Jewel Cave.

This is taken in the first room of the cave, called the Target Room. The metal shaft is the target. Before the visitor center and elevators were built, engineers had to know the location of the cave. Herb and Jan Conn were the primary explorers of the cave. They did a cave survey from the natural entrance to the target. After plotting their survey on a map, they predicted where the target would be on the surface. Engineers drilled a hole from the surface, then dropped a light on a long cord down through the hole. The hole was within two feet of the target. That was a remarkable survey! The Conns joked that the drill bit must have walked 2 feet.

The target room is very large. The ceiling is 100 feet tall. This picture shows the platform visitors stood on. The platform is easily big enough to hold 100 people. The target room is about 3 or 4 times larger than the platform.



Jewel Cave flooded during its formation. This left carbonic acid inside the cave for millions of years. The continuous exposure to carbonic acid dissolved calcium molecules (calcium carbonate) until the solution was saturated. Some calcium precipitated out, then anchored itself to the wall. The anchored molecules pulled other calcium molecules out of solution and formed crystal, which covered all the walls. Jewel Cave is a very large geode.

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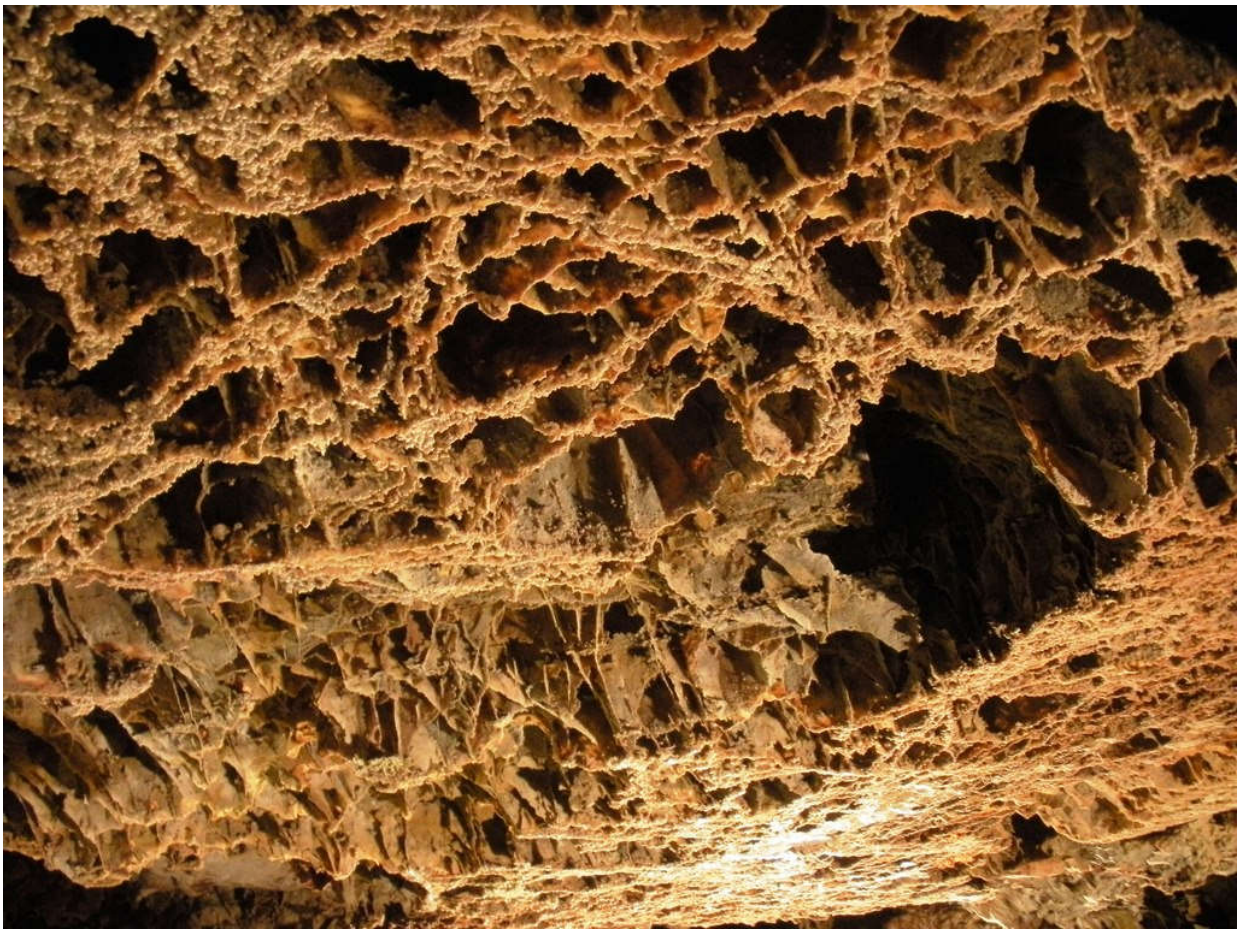
In this picture, the black area is calcium crystal (Dogtooth Spar). It looks dark because it is covered with manganese. When the water finally drained from the cave, the crystal lost the water's buoyancy and some became too weak to hold itself up. The white line is where the crystal broke. This crystal is about 3 inches thick. Below the break line is Boxwork. Boxwork is very common in Wind Cave, about 35 miles away. We think there is also a lot of Boxwork in Jewel Cave, but it is hidden by crystal. Outside of the Black Hills, Boxwork is extremely rare.



Above is a detail of the Boxwork. Boxwork formed long before the cave flooded. Limestone developed cracks. Calcium crystal formed in the cracks. The limestone was eroded away, leaving the crystal. It's similar to dissolving bricks from a brick wall and leaving the mortar behind. The Boxwork formed long before the cave flooded. There are many mysteries about its formation. Nobody knows why the limestone cracked, or how crystal formed in the cracks. The limestone erosion could have been from wind, carbonic acid, or sulphuric acid. Sulphuric acid would have formed from gypsum (Calcium-Sulpher-Hydroxide) reacting with air to make hydrogen sulfide, the gas that smells like rotten eggs. Hydrogen Sulfide can react with water to make sulphuric acid.

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About 95% of Jewel Cave is dry because of the impervious cap that was laid down on top of the limestone. However, there are a few wet rooms where water leaks into the cave. Secondary formations, such as stalactites and stalagmites, form in these areas. This picture is taken in the first wet room of the tour, called the Formation Room. The picture shows a special stalactite called a soda straw. Soda straws are hollow. Water goes down the inside of the straw. The water can't release its carbon to the atmosphere as CO_2 until it reaches the bottom of the straw. After that, a few molecules of calcium are added to the tip of the straw, making it a little bit longer. Soda straws are extremely fragile. They usually fall from their own weight before reaching a foot in length. This soda straw is over 3 feet long – a very fragile formation indeed. When the bottom of the straw hit the shelf, the hole was plugged up and water started flowing down the outside. This is why the top of the soda straw is thicker than the rest.

This is a picture of the ceiling of the formation room. You are seeing thousands of small stalactites.

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Below is a picture of a very large flowstone near the back of the Formation Room. Its nickname is Java the Hut.

Here are some small draperies in the Formation Room. There are some wonderful large draperies later on in the cave, but the picture didn't come out.

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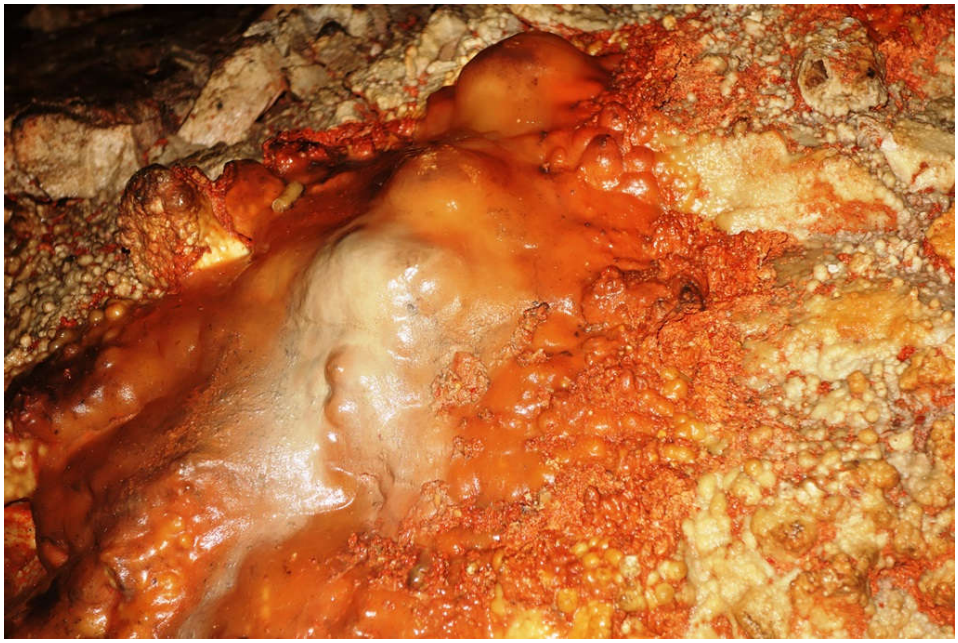
This flowstone is created from a combination of calcium dripping from the ceiling, sand, and iron oxide (rust). On tour, I called it Boy Scout dinner, with caramel, cheese, and taco meet boiling on the fire. But really, it looks like it had been regurgitated.



This ribbon formation is over 24 feet long. Coloring from various minerals, including iron oxide, makes it look like bacon. We call it Cave Bacon. We say, “The bacon is real, but it’s not real bacon.” This was the favorite formation for most visitors. It looks exactly like very good, crispy bacon.

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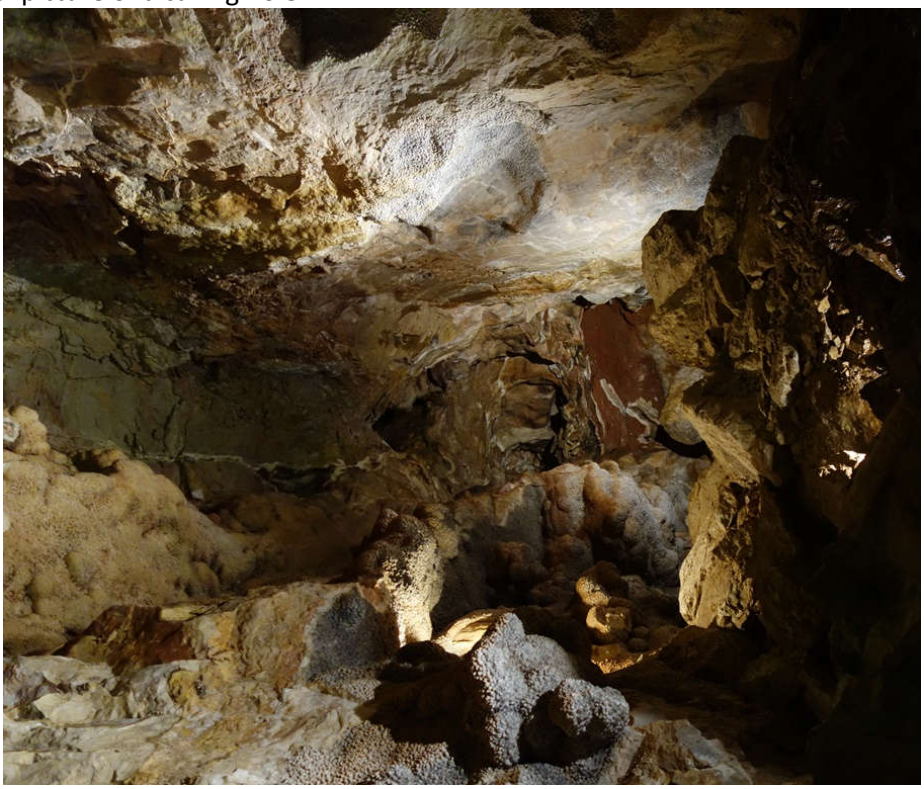
Below is a cool picture of a caving hole.



This picture comes from the ceiling of the largest room on the tour, called the Torture Room. When the Conns discovered the room, they could hear water dripping slowly in the distance. It reminded them of “water torture”. Other rangers told more colorful stories about how the room was named, but I wouldn’t tell them because they weren’t true. (The Conns wrote a book about their experiences exploring the cave. I read the book.) The picture looks a lot like a map of the US. A person from Texas told me that it would be a more accurate map if Texas were larger.