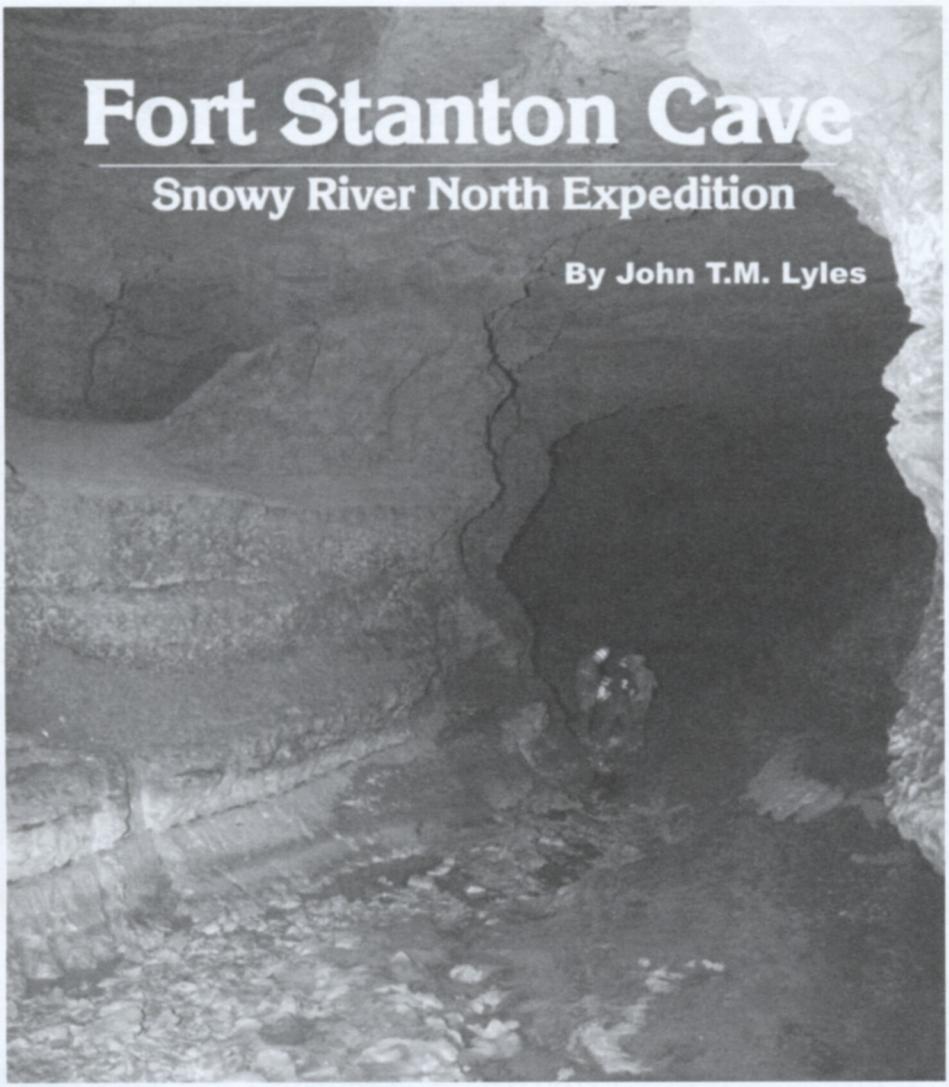

Fort Stanton Cave

Snowy River North Expedition

By John T.M. Lyles

Five cavers entered the cave Saturday morning, April 26, to explore and survey leads at the northern end of walkable passage in Snowy River (SR). The team was led by John Lyles, who, with Chris Andrews, Andrew Griego, Kat Rix and Carrie Finn, had first explored and surveyed the northern end of SR in 2003 (reported in *Rocky Mountain Caving*, Winter 2004). Along with John this time was Robin Gurule', James Hunter, Michael McGee, and Tanja Pietrass, all from New Mexico. A permit had been issued to allow John to lead a team to push a climb lead seen in 2003 in Lincoln's Bathtub, a large chamber at the end of SR, where the character of the cave changes back to dirty. Unfortunately, no photographs of this lead existed and John's memory of it was so-so, so the team had to come prepared for a variety of conditions. Michael, a hydrologist from BLM-Roswell, came prepared to sample the water at Crystal Creek for stable isotopes and water chemistry. Crystal Creek emanates from a spring at the northern end of exploration.

Because of the scope of this mission, each caver carried a large pack, with the necessary clean gear, and additional project gear. Three sets of vertical gear (frog systems), climbing gear (aids and bolts), a power drill and battery, and the water sampling bailer and bottles were all carried in, making for some of the largest packs brought to SR. The team reached SR just before noon and began to set up plastic sheets for the new transition zone. About that time, Donald Davis' exploration team for SR south came through Mud Turtle and joined them in changing over to clean mode. The Lyles team departed in a northern direction, and found that the SR section all the way to Saguaro Dome/Metro junction and a little beyond was still mostly white or creamy white, with no signs of the recent flood episode. It was noted that the plastic sheet left in 2003 on SR, and used again in 2005, was gone. The sheet on the bank was still intact, but the lower edge had been tucked under. Further on, a few scraps of flagging were found on the floor. Going north, things began to change significantly. The floor was frequently tinted beige or tan as silt had washed across. Ripple marks indicated the direction of flow, as the darker silt deposits remained on the upstream side of each ripple. More plastic debris was found on the floor, including survey station markers and larger sheets and tarps made from white plastic film.

Pools of still water began to appear in the deepest basins; originally it had been speculated that there were probably rapids in this section in earlier times when it was flooded. This trip confirmed that the recent flooding had pooled and probably swirled around and washed against the silt banks. The team was able to pass the pools by walking along the edges, staying close to the water where the crust was thickest. Several pools had considerable flagging in them. At SRN43 a large boulder bridges Snowy River. This was crawled under in 2003 and 2005, through a dry basin. Now deep pool blocked continuation via this method. John climbed over the boulder in his socks, carrying his clean shoes to the other side where it was dry again. He scouted ahead to SRN67, to make sure that the way was passable without being blocked by wall-to-wall pools. The exploration permit from BLM forbade walking through pools of water or streams, leaving the option for future biological science. It was possible to continue ahead by carefully jumping or stepping across four more narrow pools. John returned with the news and the team was off, crossing the obstructing boulder, while wearing packs and carrying their clean shoes. One person at the north side of the obstruction helped each caver climb back down into their clean shoes.

As the team continued north through the uneven sections of SR where rapids had been, the whiteness changed to dingy beige and light brown as silt had washed over it. More plastic sheets and flagging were found at regular intervals. Apparently the missing sheets at Priority 7, and perhaps even at the new Mud Turtle landing, had washed this far north to account for the number of white sheets. Any mud or silt that they carried was apparently washed by the stream so as to miraculously preserve the pristine floor from Mud Turtle all the way to north of the Metro turnoff. Frequent shoe inspection and cleaning became necessary as the cavers continued walking north. Some of the floor

Photo:

Looking north toward Crystal Creek.

Photograph by John T.M. Lyles.

was so dirty as to cast doubt on whether they should risk wearing their clean shoes anymore, as they would be needed again in the white sections at central SR. They continued to wear clean gear, however. At one point orange flagging was found shredded in small pieces, from mechanical force through the rapids.

Because SR north has many basins, pouroffs, thin crusts on the trail, and silt covering, the flagging was set by our second exploration/survey team in 2003 to mark the best route and prevent inadvertent damage. At the time we assumed that SR had been and would continue to be dry for a long time. In hindsight, trail flagging and "caution" striped markers should not be used in this passage. This sets a requirement that all explorers and researchers on SR must find the best route with each expedition, and also implies that there will be a wider band of impact than a marked trail would leave. This is an important factor for selecting future teams—that they be capable of low-impact caving along this delicate unmarked trail.

The three remaining pools were crossed by means similar to the first one, by either stepping across or by jumping. With the large packs that the team hauled, this was sometimes difficult and required passing packs across. It was a bit like the game *Simon Says*, where John would dictate what steps would have to be followed, and the word was passed on to the next person and so forth. Or maybe it was more like the game *Twister*, for some of the moves… This trip to Lincoln's Bathtub required considerable balance and dexterity, to prevent falling in the pools or breaking through the thin layer on the edges. Past SRN67, a constriction required crawling along a sand bank. Unfortunately, the water backwashed here and underneath the sand was a sticky silt layer. Several kneepads and shoes were soiled here, and morale dropped as we had to stop and clean them again. But shortly after this, the passage opened up, and after one more pool was crossed, the team was at the northern end of SR. A sheet was laid out, and the team changed into dirty mode to climb up at 4:00 p.m.

Lincoln's Bathtub

Everyone appreciated being back in dirty mode as they climbed up to Lincoln's Bathtub. John noted a slot in breakdown beside the east wall, and saw a piece of stray survey flagging below. This was the water passage that was beyond the constriction at the end of SR. It had been missed during our 2003 survey of this room. The floor of this passage was extremely eroded and pitted by water and had more pockets with stream gravel, some partially coated with tan calcite. Apparently the flood water poured off an edge of this floor to drop about 1.5 meters to the bedrock floor that drains into the Crystal Creek spring north of here. Last year this probably was an active waterfall, the first known in Ft. Stanton Cave.

Michael McGee samples water at Crystal Creek Spring.

Photograph by John T.M. Lyles.

Crystal Creek

The water from SR ran across the floor and dropped into Crystal Creek at the spring. There was some residual water still dripping here. The floor was much cleaner now than it was in 2003, when it was coated with thick mud. It had pitting and holes, similar to the floor above the pouroff. One hole had white calcite-coated pebbles in it, while the adjacent surfaces are all tan. It is mystifying to think of what sequence of events created this. We were able to judge the depth of the floodwater from SR, as a muddy boot print and scrape marks remained, probably from the 2005 visit by Jim Cox's video team. These were adjacent to the bedrock channel leading to the creek, and the water level had been below them. It was probably no more than 8 inches of overall depth, below the height of the bottom edge of the mud scrapes.

Six glass vials from cave microbiologist Penny Boston's incubation experiment were located along the floor of this area. Two were closer to the trail to Lincoln's Bathtub, and were intact. The remaining four were strewn about in the streambed, caught in various pockets. Most had the lids removed, which were nearby. Vigorous water action had agitated and tossed the vials about. Amazingly, they weren't broken and all seemed accounted for, despite the stream that poured across this floor from SR. Nearby was a tattered piece of flagging that had washed in from upstream. Contamination from human activities upstream in SR had certainly mixed with Crystal Creek during the flood event of 2007. An interesting side benefit of these glass containers was that they acted as a substrate for deposition of a calcite film. All of the bottles in the pools looked like frosted glass. It would be of interest to remove them and measure the thickness and structure of the calcite coating.

Michael and Robin sampled the spring using his sterile bailer, pouring into 500 ml containers. When SR had flowing water, it poured into the spring through the channel in the floor. Now it was only a drip, and most of Crystal Creek emanated from the spring below the edge. Standing at the edge of the immense virgin stream passage ahead, the team felt cool air movement, but couldn't tell the direction. Yet they were unable to just step into the creek and walk north, for the scientific decisions hadn't been made, and, frankly, logistics of carrying wet muddy boots back south over SR hadn't been figured out.

High Lead in Lincoln's Bathtub

Two leads were examined here. The high lead in the ceiling didn't look promising, having the appearance of a dead alcove in a breakdown ceiling where rock had spilled out. From this ceiling there is an estimated 13 meters of overburden to the surface. This doesn't leave much room for cave passage, so

expectations were not great. A second lead, north of SRN79, was a high passage on the upper left when facing Crystal Creek. It was checked by John and definitely did not go.

Tulip Garden

With these tasks completed, the team changed back into clean mode, and moved south in SR until they saw a high lead above SRN73. A new changing spot was established, and they headed up a steep slope to where the passage enlarged into a walking trunk paralleling SR. Like the Metro passage to the south, this appeared to be the ancient phreatic conduit before SR developed. It was nearly flat-floored with "borehole" dimensions, and had four windows that dropped back down into SR. Several of these were unseen from SR, appearing from below as blind ledges and slopes to nowhere. This upper level had a floor of mud with drill-holes, several areas of golden flowstone, "fried egg" formations, and some gypsum coatings, along with smaller breakdown. Spectacular upright calcified mud formations had formed at splash cups, some in the shape of flowers. This led to the name Tulip Garden for this passage. Starting with SRA1 off SRN73, they surveyed across a large window dropping back down to SR, continuing along the same elevation to SRA6. The shortest shot length was 27.2, with most shots in excess of 50 feet. Unfortunately, the passage ended going south and dropped back to SR. They surveyed SRA7-9 down this slope to tie back into SRN61. A total of 497.6 feet was surveyed in Tulip Garden.

The survey was complete at 8:30 p.m. and they changed back to clean mode, completed the tie-in shot at SRN61, and departed at 9:30 p.m. At the low crawl just before the old Priority 7 junction, there was a hanging survey flag that had been immersed in the floodwater. It was calcified with a white layer. The team reached Mud Turtle at 11:15, changed and started the crawl out at 11:40. The trip was very slow, as one of the cavers was exhausted, out of water, and needed more frequent breaks from crawling. The extra time required eventually depleted everyone's water. At Don Sawyer Memorial Hall, James and Tanja were instructed to go out to let the expedition leader know that we were okay, as our official out time was 4:00 a.m. The last three reached the ladder down into the mud at Sewer Pipe at 1:22 and were out of the cave by 3:10 a.m.

Surveying the Tulip Garden, one of the new discoveries of the April expedition.

Photography by John T.M. Lyles.

One of the strange conulites of the Tulip Garden.

Photograph by John T.M. Lyles.

Conclusion

All leads in SR north of SRN61 have been completed, except for the obvious stream lead. The upper-level climb lead from the proposal appeared to be a dead-end. The drain for SR was located, where it falls to the floor above Crystal Spring. This overflow was dry again, with only standing water in small cups and pools. It was evident that the flood in SR was probably a modest flow, but with enough energy to move plastic sheets a long way, and toss about the vials of a science experiment. Water samples were taken at Crystal Creek, which was clear and flowing. An additional water sample was taken at Government Spring, beside highway 380, on Sunday by Michael McGee and Robin Gurule, using the same protocol used in Crystal Creek.

The flood in SR did overflow the banks of the white formation in some places, which introduced silt into the stream. Enough silty bed load was carried in the flood that it caused significant changes to the appearance of SR where the terrain allowed it to settle out. SR is no longer creamy-white in the north, but given the dynamic hydrological changes of the past year, another lesser flood could reverse this trend with a "white-wash" overcoat. Flagging debris and sheets of white plastic film were found throughout SR where it became rapids and deep pools. These will need to be cleaned out soon. Finally, it should be noted that trips to SR north require strong cavers with adequate time and preparation, as the step-overs are physically challenging. The floor is delicate, but has soil which tracks on clean shoes, so constant care and diligence is required. ■