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**by Jim Hanhardt
January 4: , 2012**

My Introduction to Kokoweef (February 1983 to November 1985)

I became interested in Kokoweef after having read an article in [Saga's Treasure Special 1974](#) in February of 1983. I had been injured in a mining accident while sinking shaft for J.S. Redpath at the Lucky Friday Mine's Silver Shaft. (The North American shaft sinking record of 121'/week, which still stands, was set at that project.) While recovering from the accident working light duty in the headframe dumping buckets, I read a magazine left by a coworker in the warm-up shack. The magazine was 9 years old and contained an article on the Underground River of Gold. The article captivated me and so I took it home and showed it to my wife. I then put it away for a couple of months to see if my interest would wane. Reading it again confirmed my interest and so I searched for more information. The November 1940 issue of the California Mining Journal (obtained on a library-to-library loan from Santa Cruz, CA, see [CMJ Affidavit](#)) showed the affidavit as described in the magazine article. Next I sought some geological information and found some general geological maps and a Bureau of Mines Report of Investigations 4522 of the Carbonate King Zinc Mine (August, 1949). I also purchased some topographical maps of the area.

When the Silver Shaft in Idaho was completed in the early summer of 1983, Elroy Zentner (my brother-in-law from Tooele, Utah, who had a 4-wheel drive truck) and I traveled to Kokoweef to look the area over. The magazine left the impression no one had been back to the cave after Dorr blasted it shut and I was surprised to find people at the site. At that time there was a truck-mounted well drilling rig set up in the middle of camp with the drill bit stuck tight in a hole being drilled to find water (or a cavern). One of the camp residents took Elroy and me on a tour of the Crystal cave tunnel and caverns which included climbing the Ladder Raise to the Upper Caverns, viewing the Meat Grinder, looking down into Schnar's Hole, and climbing into the first of the White Crystal Rooms. After spending the night camped out on the dump (entrance to the tunnel), we went into camp and found Bill Herkert and Ralph Lewis there. Those gentlemen had not been out to Kokoweef in some time and finding them there in mid-week was fortunate as we talked for several hours about the legend and project. I learned a lot from that conversation and left the geological information I'd gathered with Ralph.

Drilling a water well for camp and tunneling under Schnar's hole were the main focus at the time. It was obvious the fellows driving the tunnel at that time were not experienced miners and weren't making efficient headway. I was interested in the project, so Bill and Ralph told me to go see Larry Hahn at the surplus store in Las Vegas as he was overseeing the operations for Legendary Kokoweef Caverns. I introduced myself as an experienced miner with 11 years (at that time) experience and that I was interested in the project. Larry wasn't interested in additional tunneling help at the time. I was in telephone contact with Larry for the next few months offering advice on more efficient exploration mining methods.

There was no further contact for a year until one night in October of 1984 Larry called to say he'd formed a new company, Explorations Inc. of Nevada, and wanted to drive a tunnel under Schnar's Hole.

I told Larry if he could give me a direction, a sight line painted on the ceiling (commonly used method in mining) I could drive a tunnel. I came out in December 1984 and started driving tunnel and again in June of 1985 with Ged Miner, another experienced miner (see [Kokoweef Newsletter, January 21, 1985](#) & [Kokoweef Newsletter, June 21, 1985](#)). We became efficient at driving tunnel with the equipment we had but were concerned about the bearing we were given to line up the tunnel to the target. A radio transmitter and receiver device used for locating under-the-street utility tunnels from the surface was employed to give us direction. The transmitter was placed at the bottom of Schnar's Hole, the receiver indicated the transmitter's location, and a blue line was painted on the ceiling. The line-up changed from day to day and the tunnel curved. On the last day there we tried to longhole (a means of drilling an up to 60' hole with a jackleg drill) into Schnar's Hole using some scale maps Ralph Lewis had made of the Upper Caverns and were unsuccessful. We came to find out the mapping had been done in two different scales (20'=1" & 30'=1"). So the available mapping we had and the radio/transmitter direction finder were inadequate for our purpose. I knew from tunneling in that hard limestone we could tunnel past a void that lay just 2' out in the wall and never know it; we needed an accurate survey to guide our exploration.

Larry had found an air slusher (a compressed air powered double-drum winch for pulling a slusher bucket, a type of dragline bucket; slushers are common mining equipment) and in September 1985 I came to Las Vegas to deliver a slusher bucket, fabricate a roller cage to the front of the slusher (to guide the cables onto the drums), and repair the "Mule" (a small rail locomotive to pull the ore car). But mainly I came to get a survey done that would "tie" Schnar's Hole to the tunnel (see [Kokoweef Newsletter, September 25, 1985](#)). Larry contacted a surveyor, Kolowski, to do the surveying and mapping. Kolowski provided a simple line drawing map that showed the relative positions of the tunnel face and Schnar's Hole. I went into Crystal Cave a couple of days after the survey and with a Brunton compass took strike and dip angles (horizontal & vertical orientations) of the fault that Schnar's Hole was on. I averaged the dip angles and told Kolowski to project that angle to track level and that was our target. His instructions were to turn 22 ½ degrees left measured from the last back sight and tunnel about 40' on that line.

In November 1985, Kim Hanna and I came out to drive that tunnel. We set up the slusher to reduce the tunnel size (3' x 6' compared to 5' x 7' for the track mucker), drove 40' of tunnel, and then slabbed out a ballroom for longholing. We found a small red streak on the East wall of the ballroom that I had Jim Serril examine. Asked if it was significant, he replied that he thought it might be. It turns out that it was the Eastern most expression of Schnar's fault found at that level.

While mucking out that ballroom we found a fist size breathing hole that nearly sucked the flame off of a Bic butane lighter. That little breathing hole led eventually to Hilary's Hole (later Che's Hole) (see [Kokoweef Newsletter, December, 1985](#))(see [Crystal Cave Lower Tunnel Map](#)). The lesson learned is that SURVEYS WORK. The electronic/radio gear doesn't work reliably in that non-homogeneous, void laced, steeply inclined strata.

As the stories of past exploits at Kokoweef were related to me it became clear that many attempts had been made in the past to tunnel to one target or another using a "by guess and by golly" method. A couple of examples of this can be seen when walking the tunnel that leads to the Ladder Raise (which is the route to the Upper Caverns). As you walk along from the portal, you can stand in the first intersection and look up to see a raise (mining term for a tunnel going up) that goes up out of sight (it dead ends up there). A few more yards will bring you to a raise that starts in the right (northwest) wall and goes up out of sight (also dead ends). Those raises were attempts at holing through into the Upper Caverns. Why did they drive those raises in those spots? The story is told that someone went down into Crystal Cave to reconnoiter, climbed out of the cave, hiked down the burro trail, walked into the tunnel a ways, stopped, pointed, and said "That-a-way". The Ladder Raise was successful because someone got the surveyor from the Mountain Pass Mine to come out and perform an accurate survey. (I eventually came across the map from that survey and later found some of the "spads", or station points that surveyor installed, see [Crystal Isometric](#))

Conclusion: SURVEYS WORK. Surveys are the accepted standard of the mining industry. Accurate surveys are the foundation of useful geological mapping, and efficient mining. It's no different, really, than the carpenter's adage "Measure twice, cut once".

Later (1986), I learned how to survey, and over the ensuing years (1988 – 2003) surveyed a few of the caves, tunnels, geological features, geophysical lines, and other points of interest in, on, and about Kokoweef, using 5 different survey instruments. You may ask, and rightly so, how accurate were the surveys, given they were done by a non-professional? Surveyors check their accuracy by "closing the loop", that is, they survey their way around a circuitous route of multiple points back to the origin. The calculations are made, and the new coordinates of the origin are compared to the old. Over those many years and variety of instruments, the accuracy on the loop that closed on the USGS Brass Marker at the peak of Kokoweef was within 1 foot.

Jim Hanhardt

I hope you've enjoyed reading about this stuff; I've certainly enjoyed remembering it. The next article I'm planning to present is:

Finding Hilary's Hole and Driving the Psychic Decline (November 1985 to January 1988)