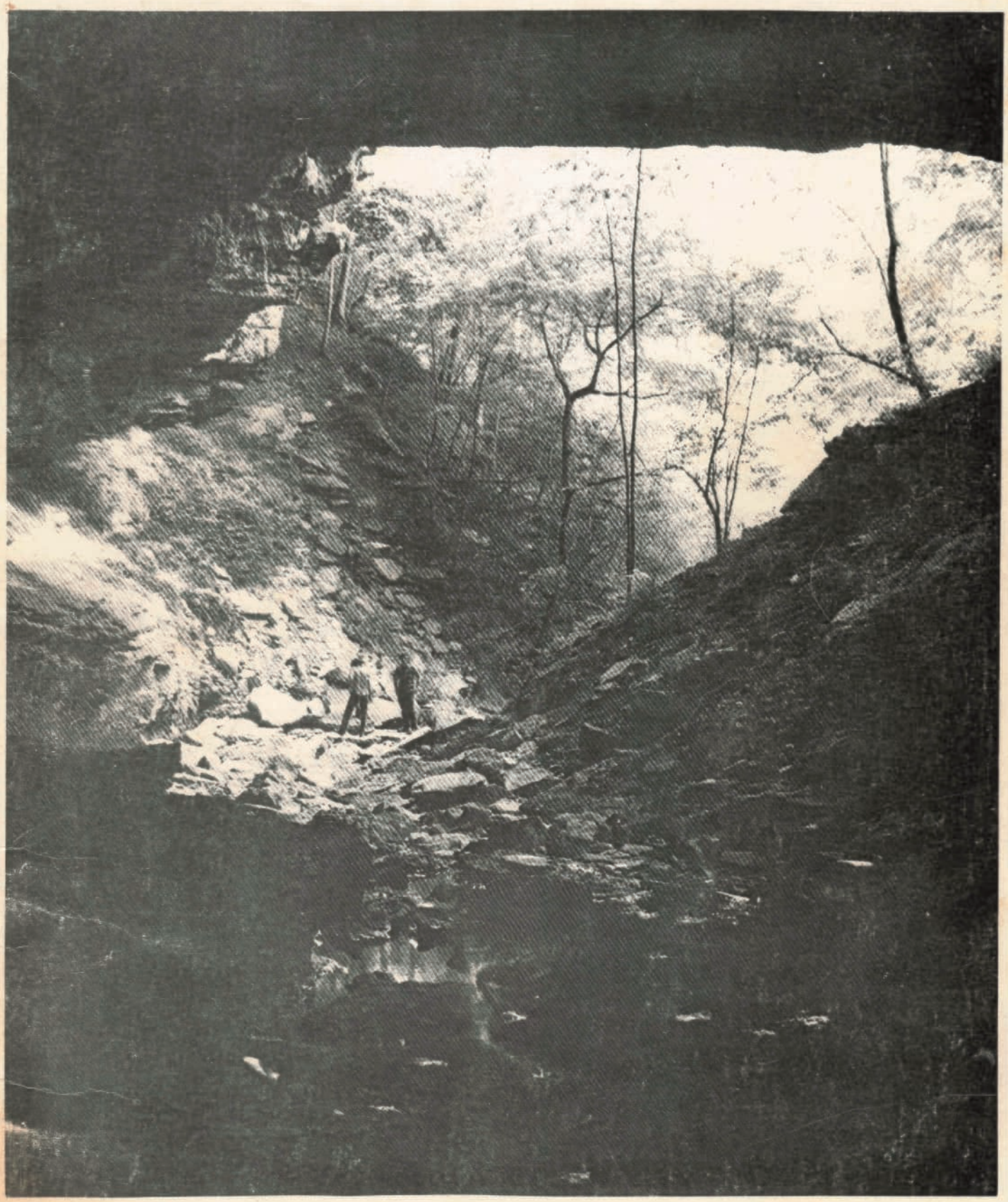
SWORCA DIGEST 1975

SOUTHWESTERN OHIO REGIONAL CAVING ASSOCIATION



SWORCA DIGEST 1975

Southwestern Ohio Regional Caving Association

This is the first publication of a group whose caving activities up to now have not been publicized. SWORCA has maintained secrecy in order to protect cave locations, especially those that are in a delicate or endangered state. We now dedicate this book to caves and caving in the hope that the conservation-minded may read and benefit by what knowledge we have gained.

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Thanks is expressed to all individuals who contributed time, and energy to this publication.

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COVER PHOTO

Goochland Cave Entrance, Rockcastle County, Kentucky.

Q. and A.

About SWORCA

What Is SWORCA?

SWORCA is a group of very active, dedicated, conservation-minded cavers from the Ohio, Kentucky, Indiana Tri-State area. Most are NSS members, but SWORCA is NOT a grotto of the NSS per se. Monthly meetings are held at the University of Cincinnati for the purpose of caver fellowship and sharing of caving ideas and techniques. Co-Chairmen Richard Sellers and Tim Kettering agreed to plan meetings and most caving activities.

What Activities Does SWORCA Perform?

Just about anything that deals with caves and caving: Exploration, Mapping, Rescue, Vertical Sessions, Conservation Projects, Photography, Caving Electronics, You name it!

Are SWORCA Meetings Open to Everyone?

Yes, if you're a caver. We have trained quite a few cavers from scratch, but prefer to have experienced cavers enter SWORCA. The weekend tourist-type "SPELUNKER" is a dime a dozen, the abundance of which has led to the following inside bit of vocabulary which all our members know. It is appropriately entitled . . .

SWORCA'S NURDALMANAC

(A random list of terms commonly used by gung-ho SWORCA cavers.)

NURD—A Natural Underground Resources Destroyer; always a squimish, neophyte, tenderfoot caver, commonly found carrying a flashlight or Coleman lantern in dry level passages near cave entrances.

NURDISH (or Nurdy)—Like a nurd or having nurd-like qualities.

NURDISM—The art of being a nurd.

NURDLY—In a nurd-like fashion; performing like a nurd.

NURDIST—One who thinks like a nurd.

NURDOLOGY—The science or study of nurds.

NURDOLOGIST—A professional nurd.

NURDOGLYPHICS—Markings or defacements frequently found on cave walls.

NURDOLYMPICS—What would be called an advanced novice trip to a half-way decent caver.

NURD TRIP—Any trip a nurd goes on.

NURD PADS—Soft protective coverings worn on the knees of a nurd.

NURD BOOTS—Gym shoes.

NURD MOBILE—Anything less than 4-wheel drive and 12" road clearance.

NURD HUNT—The majority of cave rescues.

NURDING OUT—Escaping a difficult trip by the making of worthless excuses unbecoming a gung-ho caver.

NURD MOTIVATOR—A carbide flame in the rear-end.

NURD DETECTOR—Any low, wet mudcrawl.

NURD PINCHOUT—Less than 5-foot ceiling height.

NURD PROOFING—The reason why we gate caves.

NURD POLLUTION—Random carbide deposits or piles; various other trash left by nurds.

NURDOPLASMOSIS—Dread discomfort suffered by nurds, characterized by dirt on the coveralls.

SUB-NURD—Not good enough to be called a nurd.

NURD-ON-THE-RUN—Instinctive fear reaction of a nurd when a difficult trip is suggested.

NURDIN AROUND—Any dubious hesitation on the part of a nurd upon meeting a difficult caving situation.

NURDOPHOBIA—Fear or hatred of nurds.

NURD CRISIS—What our caves face if we don't stop the nurd traffic.

AVERAGE NURD DAY—1 hour in the cave; 3 hours rehashing the trip; 3 hours eating in restaurants; 8 hours wasting time on Karstland Excursions; 9 hours sleep in a Holiday Inn.

ANTI-NURD—The people who wrote this article!!!!

Editorial:

The SWORCA Philosophy

To go caving is to declare war. Caving is a battle on a major front; it is man against the elements, more specifically cave vs. caver. Caves by nature are muddy, wet, tight, dangerous and to normal people, miserable.

To be a caver you must win out over these countless toils which the cave provides, in fact, you must not only tolerate them, you must grow to love them. The key is a strong mind.

Remember that to maintain caving integrity you can't let a cave get the best of you. If the cave dishes out too much to you on one trip, you have no choice but to return and prove to the cave that you're the strongest.

If you think that this will win the battle, you're wrong, because if the cave can't beat you physically it will try to interfere with other aspects of your life.

You'll find yourself the POORER because of the innumerable repairs to your jeep, truck or car, gasoline, lighting equipment, speleo huts, vertical gear, coveralls, gloves, cave radios, photo gear, possibly even doctor bills when your companions accidentally drop a rock on you, or you fall, etc.

As though this is not enough, the final blow is psychological. The true caver once hooked, has a tremendous obsession to finish mapping a system to the point where this must come first above everything else. Your total lifestyle is affected and you find yourself making excuses to go caving to your friends and relatives.

Does all this sound like you deserve some sympathy? You certainly won't find it from your fellow SWORCA members. Complainings against the rules.

If you have just checked out a 7½-inch high water crawl for 200 feet while the rest of the party sat there waiting for you, you might slip up and start to imply slight hints of distaste for the cave. This is a NO NO!

The imperial quotation from Tim Kettering is "you gotta put out for SWORCA," then after you've put out all you would have believed you could, you have to force yourself to put out even MORE, and then come out SMILING. It's the only way to keep face in the group.

Perhaps this is a slight exaggeration; perhaps not! In any case we wouldn't trade our group of cavers for anything (almost). It's a great life and fantastically exciting. If you don't believe it come caving on the next SWORCA trip!

SWORCA Meets the First Thursday of the Month, Why Not Join Us for a First Rate Meeting and Slide Show.

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CAVING WITH SWORCA...



AROUND THE WORLD

INTERNATIONAL PERSPECTIVE.....

Caving in Austria —By Thomas M. Gracanin

Austria! Land of rugged beauty: of gorgeous mountains, of idyllic often still wild valleys, of foaming rivers—in general a land that would thrill an outdoorsman. Nice for tourists, you say. But what about us troglodytic cavernophiles?

Ah! Do not despair, my dear troglodyte! Look closely. Unknown to most mortals a large part of Austria's mountains rest on hollow foundations. A massive Tertiary limestone belt of vast thickness stretches across the Upper Austria and Salzburg provinces into Germany. Silurian and other limestones outcrop in other provinces. During the crustal disturbances that built the Alps, these limestones were folded, pulted and raised high above sea level. Often tremendous subterranean rivers developed as water from the high alpine karst plateaus sought the shortest route to the valleys. The huge trunks in the Eisriesenwelt and the cave of Tantalus are abandoned channels of such rivers.

In general the subterranean streams—like normal alpine streams—cut high gradient channels thru the mountains. For this reason, and because of the folded nature of the limestone, few passages are level for long distances. Instead, frequent, often extreme changes in elevation are the rule. They range from the common short chimneys and ladder pitches to the likes of the main trunk of the Cave of Tantalus which drops 600 feet, then in a short distance rises 600 feet. The Lumprechtsofen Cave (13km or 8 miles long) has been ascended 740m (2427 feet) from the entrance. Often passages are so steep they are hard to tell from the frequent vertical shafts. Shafts of up to 100m (320 feet) are common and deeper ones are not especially rare. One, the Stierwascherschacht (Ox Washer Shaft) in Upper Austria's Hochlecken Cave was alledgedly explored to a depth of -420m (1378 feet) by Austrians before they were turned back by masses of falling water. Some Frenchmen—during a dry spell—recched botton at -620m (2040 feet). Apparently 500m (1640 feet) of this was in a single drop. After a short horizontal passage the shaft continues—unexplored.

I learned all this and more during my visit to Austria in 1974. I visited the Salzburg Caving Association's headquarters in the historic city of Salzburg one evening. An enthusiastic group of cavers was discussing recent accomplishments and future plans. A high school student (Walter Bittner) showed me the pile of vertical gear and rescue equipment in the headquarters. He explained that each member was trained in cave rescue operations. In case of emergency, the government provides helicopters or jeeps for transportation to remote caves.

He then rolled out a map of a cave. "Berger Cave is really interesting," he said. "It's about 14km (8.6 miles) long and has the possibility of connecting to a cave higher up the mountain. It's typical of the caves around here, I guess. Do you want to go see it?"

I eagerly agreed. "But I haven't any caving gear," I said, disappointed. "Don't worry, we'll dig something out," Walter grinned. The next morning we were clickety, clacking down the main line from Salzburg. We got off the train in Golling, shouldered our 50 or 60-lb. packs (no frame) and hiked the couple miles to Pass Lueg, where some Austrian freedom fighters defeated the French Army during the Napoleonic Wars. After a delicious beer at the tavern, we started up the north slope of the Tennen Mountains.

I was amazed at the luscious jungle-like vegetation. Our extremely unimproved trail wound through dense stands of large fir trees, thickets of 5-foot tall ferns, around moss-covered logs, and over a black moist soil. The south side of the Tennen Mountains, which I was to see a few weeks later while visiting the giant Eisriesenwelt Cave, is the complete opposite—a much more barren, sparsely vegetated region.

In about four hours, after climbing several small cliffs, and crawling under fallen trees, we reached the alpine "Speleohut," an abandoned hunter's shack in dense forest. After chasing out the pack rats we ate lunch and then walked a short way down the mountain to Berger Cave. The wind howling from the entrance made it difficult to light our hand-held carbide lamps—each about the size of a 2-lb. carbide can with a 4-inch reflector. They run about 10 hours or more per charge. A dim electric headlamp, powered by 4 AA batteries was our extra light source. Walter carried a heavy waterproof vinyl bag with shoulder straps, and I had my camera and flash. The entrance passage sloped up into the mountain. In spite of the fact that the air temperature was in the upper 30's (Farenheit) we were soon sweaty as we climbed over and through breakdown in what would have otherwise been a large passage. The incredible wind continually blew our lights out, and it was a hassle lighting them. Finally we dropped down to the right, chimneyed down to a permanently fixed ladder, and climbed down to a flatout belly crawl with 2 inches of water.

"This is the Bay of Pigs," Walter said in a surprised tone. "It's drier than I've ever seen it."

"Oh," I sniffed, and wormed thru on my toes and fingertips. Since the water temperature is about 32 degrees (Farenheit), I didn't particularly want to get wet. Walter told me that since many Austrian caves are pretty wet, full body waterproof leather motorcycle outfits have become pretty popular cave clothes.

The cave opened up immediately beyond. After about a half dozen ladder climbs and descents, and several traverses on standing ropes with bolts as footholds, we reached the "Autobahn

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Stollen" (Expressway Tunnel.) Here I had a question for Walter. "How come the ladders end 6 or 8 feet off the ground?"

"Well, when they were put in a few winters ago," Walter grinned, "they did reach the floor. But it was an ice floor which melts during the summer and leaves the ladders high and dry."

We continued down the Autobahn Stollen. It started out as an 8x8 foot arched passage (typical in alpine areas be cause an arched geometery can better support the weight of the mountain above) moving lots of air. Suddenly it opened into a huge 100-foot wide passage in which the floor sloped from right to left at a 45 degree angle. Down on the left was the bivouwack. It was constructed with light lumber and sheet plastic, and large enough to house 4 or 5 people. Walter said that nearly every sizeable cave had one or two. Stocked with supplies, these bivouwacks served as shelters from which to run expeditions.

We ate our own meager meal, then continued into the cave. The huge room closed down to a 15 foot wide by 4 foot high stoopway. As we approached it, gale force winds immediately put our lamps out, so we flipped on our electric lights and groped our way into another huge hall beyond. After awhile this hall pinched down again to a 3 foot high by 10 foot wide hole, and again our lights were put out by the gale. I even hung onto my helmet so I wouldn't lose it!

Beyond the passage began rising sharply. We climbed up an endless slippery slope (about 40 degrees) that fortunately had permanent handlines in place. After half an hour of this, the passage narrowed from it 50 by 10 dimensions and, as we passed an incredible torrent of water down in a slot to the right, we were forced to climb and chimney up over breakdown. The passage—smaller now—cork screwed and continued on up.

"We're close to the end of the known cave," Walter said, sweat pouring from his brow. "The going gets awfully rough soon. Guess we might as well turn back, it's late."

I agreed, and we headed out. I took quite a few slides on the way. We reached the hut sometime after 3 a.m., flopped down on the hard boards and slept soundly. Next morning Eddie Vogler joined us. We packed 100m of rope and vertical gear and hiked up into the vicinity of the highest peaks to explore a new shaft. It took about four hours of hiking three forests, over snow fields and barren fields, before we got to the shaft. On the way Eddie pointed out some 80m deep shafts, still buried by snow, and the entrance to an ice cave.

Eddie set a bolt at the entrance and we rigged the rope to it. Walter went down to explore. He used an American-type rack to go down, and Polish-made Jumars to ascend.

Meanwhile Eddie climbed around on a nearby cliff checking out holes. He didn't find anything, but did scare a pair of mountain goats, that incredibly enough, raced up the cliff in no time.

I sat around in the sun for a while, enjoying the view into the Salzbach River Valley far below us and swatting at the huge deer flies that swarmed about. Later I ran around in the stunted pines and managed to find another cave about 50 feet long with a promising dig at the end.

Walter finally climbed out of the shaft to report that it was about 20m deep with a narrow slot in breakdown, through which he could see into another shaft.

Disappointed, we coiled the rope and headed down the mountain as evening approached. Before long we were stumbling along in complete darkness. Eddie knew the way pretty well though and we managed not to get lost.

We ate a huge meal back at the hut, consisting of canned sardines, cheeses, home-baked bread, salami and hot tea. Then to prepare ourselves for the strenuous hike back to civilization, we dove into our sleeping bags and slept soundly.

Golandrinas Mexico

"VERTICAL DAVE KELLEY—A Profile

Whether it's instructing one of the SWORCA climbing practices in the U.C. Fieldhouse or descending into Georgia's Ellison's Cave, David Kelley lives up to his name. Dave recently returned from a major trip into Golandrinas Cave, Mexico with its incredible 1400-foot entrance drop. Both a SWORCA member and BGG member, he has helped many cavers improve their vertical setups. Dave, a mechanical engineer, designed his own custom-built rack. Also he has helped on many survey trips in Goochland Cave with SWORCA on the right and Jim Rebmann's group on the left side, although his main interest could be considered the exploration and mapping of James Cave in Kentucky. A program on Dave Kelley's Golandrinas Trip will be seen at an upcoming SWORCA monthly meeting. The only reason we haven't seen his program is the fact that it is being shown at other Grottos.

Caver's Quotes

"Back Off You Nurds! This is going to be an INTENSE TRIP!"

Larry Simpson—Canadian Rockies Motion Picture Expedition to Castleguard Cave

One of our own SWORCA members, Larry Simpson has completed two expeditions to the beautiful and rugged Canadian Rocky Mountains for the purpose of assisting in the making of a film for the Canadian Government on the discovery and exploration of Castleguard Cave. And what a setting this cave provides, for the journey takes in some of the most spectacular Alpine scenery on the continent.

Snow covered peaks make the use of a helicopter necessary for transporting persons and supplies to the base camp near Castleguard's entrance. And so it was with Larry. On board the copter he shot a number of spectacular slides which he shared with us all at a recent SWORCA meeting.

Among the internationally renowned expedition team of speleoplogists, cameramen, actors and cavers was Ralph Ewers, past chairman of the Greater Cincinnati Grotto and more recently a doctoral candidate at McMasters University in Ontario. Ralph was a close friend of Larry and other SWORCA members and, we might add, a fantastic caver with a phenomenally brilliant personality.

The actual filming inside Castleguard was performed with specially designed light sources powered by lead-acid snowmobile batteries. Larry's job was to help move some of this gear into position for filming. At times parts of the cave flood, making exploration very hazardous. Once some members of the team were trapped by water from melted snow, but were able to escape narrowly when water levels went down briefly. Immediately afterward the cave again flooded. It was not until several weeks later that the water receded! Our thanks to Larry Simpson for his program on such a spectacular trip.

A Mountain Experience

By Ken Tankersley

Atop a ridge you sit on an overhanging boulder, greened by lichen. Here you lean back, a mountain laurel cushioned with moss becomes your pillow. The valley rolls into your view, the smell of white pine and hemlocks arises with the morning mist. Suddenly you notice the new born light creasing the hills with its yolk yellow and the clouds above begin to flame a mellow orange. On the cliff face afar, a cave overflows with its warm breath of life, the plants start to unroll from their security as nature begins to speak. A trout beneath a moss covered rock begins to wave in the silver sweet water, a bronzed hawk skims above the tree tops, while to his back the soft blue sky pushes out the flaming clouds. Instantly you realize you have witnessed the birth of a mountain day.

Caver's Quotes

Take nothing but pictures, leave nothing but footprints and good will, kill nothing but time and wear nothing but ELECTRIC!

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Mexican Caving—A First Time

By David Kelley and Karen Hoskins

The inherent tendency in vertical caving is to go deeper and climb higher, and this reaction will go on forever. Such was the recent desire of six cavers from Kentucky, Ohio and Indiana. After several years of horizontal and vertical caving, suddenly there appeared among them on a summer's day a 1200-ft. spool of Bluewater II rope and the hushed whisper of "What are you doing Christmas?" My answer was "Going to James, of course." Their reply was "Ever thought of Mexico?" For all avid followers of the science-sport, Mexico is the area with the largest collection of deep pits and caves in the world: El Sotano, Golondrinas, etc.

Plans were made quietly to avoid having to say no to other people; six people in a pickup truck for 4000 miles and two weeks was plenty, As the group finalized, it consisted of Bill and Nancye Eidson, Ron Gariepy and Karen Hoskins, all of Lexington, Kentucky; Frank Reid of Bloomington, Indiana, and myself, Dave Kelley of Cincinnati, Ohio. The skills varied but all shared in some responsibility. These ranged from vertical and horizontal caving experience, money for a rope, radio communications experience, hiking experience, speaking semi-fluent Spanish, to owning a running pickup truck. Plans jelled and the trip left Lexington, Kentucky on Saturday morning, December 21.

The actual plans were adjusted enroute as we left in a sleeting rain with a basic attitude of "Let's drive until your arm gets warm when you roll down the window." The first substantial stop was in Austin, Texas about 11:00 Sunday morning to pickup the latest Mexican input from Craig and Steve Bittenger. However, only Steve and his wife Serina were available for consultation, having returned from Mexico the day before.

By now the warm weather had softened us, so the next stop was San Antonio and the Alamo, with a brief taste of Mexican food in a restaurant along the Paseo. We spent Sunday night in Kingsville, Texas with Mr. and Mrs. Stan Bittenger, Steve's parents. This gave us a full day to cross the border. By 2:00 p.m. the next day we were the foreigners in Reynosa, Tamaulipas, Mexico. We headed for a microwave tower, about 140km south of the crossing, which we were told was a good place to camp. Frank Reid took some impressive pictures the next morning of the camp and the countryside from three-quarters of the way up the tower. The rest of us waited for the rat-a-tat-tat of an automatic rifle. Soldiers had been visible many places to protect tourists—Mexican and otherwise—during the Christmas holidays from increased terrorist activity. But Frank managed to avoid an untimely end.

The second day in we stopped to visit El Abra, a short cave with large passageway and a 299-ft. skylight. An attempt to drop the skylight was foiled by thick underbrush on top of the hill in which everything we touched hurt. The evening was spent in a caver hangout near Ciudad Valles called Los Sabinos. Old friends were found and the bull was shot, and finally we got to bed. When I awoke in the morning what was previously a peaceful clearing, was filled with four or five vans, cars, trucks, etc., and people were everywhere. The clearing had taken on the appearance (peoplewise, at least) of southern Indiana, around a certain R. Blenz's barn. It was here that the soon to be named Marx Brothers, two skinny teenagers from Bieville, Texas attached themselves to our trip. (They shall mercifully remain nameless) By talking with Jim Rodemaker we recieved general directions to a 700-ft. pit, called Soyate after an indigenous tree. After six hours of beating the jungle (sans machete) we left unfulfilled a second time and headed south of Ciudad Valles to Aquismon to begin early the next day to "do," the trip's main objective, El Sotano de las Golondrinas, translated "the pit of the swallows."

Noon, December 26th, finally having acquired all needed permission, rope porter, etc., we began the trek into the mountains on the Road to Tamapatz. The trail wasn't like those we hiked in the Boy Scouts. It reminded me of a silty stone-filled river bottom the day after the flood water went down. By 7:00 p.m. (in the dark) we reached our home at the pit for the next two nights.

The next morning revealed the pit, and "impressive" would be a gross understatement. The 150-ft. by 200-ft. entrance and the 1100-ft. drop were unbelievable. The pictures we had seen belied the karst-like conditions around the pit and at the rigging area. (True karst in a strict sense.) The original intent was that five of our party would descend and return. As it was, there were only four of our party and one of the Marx brothers participating, due mainly to a scheduling problem. "The Three Stooges," three young itinerant cavers from various U.S. locations, arrived on the scene. They had wandered up to the pit with 300-ft. of 7/16" Goldline and 150-ft. of 3/8" Goldline hoping to use someone's rope. (Beware of the Pit Vultures! They lurk everywhere.)

When my turn came there was the eternal moment of "What am I doing this for?" Thirty minutes later I began to appreciate how big the bottom was; five acres was a lot of ground even without the 60-ft. cliff in the middle. My climb out around 8 p.m. was uneventful and from semi-darkness out into a moonlite night. My only good sense of movement came from tipping my head back occasionally. Finally

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there was that blessed moment when I could no longer see the entire circle of the entrance. Soon I could see the edge and vegatation clearly, and with the aid of one man, a pulley, and a jumar to lift the rope weight below me, the break over was straight forward. The next day we derigged and plodded back down to the truck waiting behind the Municiple Building in Aquismon.

Finally it was New Year's Day and the time to leave arrived. We began to retrace our steps, but this time planned to cross at Nuevo Laredo, so a side line trip could be made. We visited a well-known cave, Gruta del Palmito, which contains two very large rooms. The trick was that the entrance was 1200-ft. above the parking area. The enormousness of the rooms was too much to grasp—one 1200' long and the other 1800' long. With the back of the cave 900' below the entrance this was a hikers paradise.

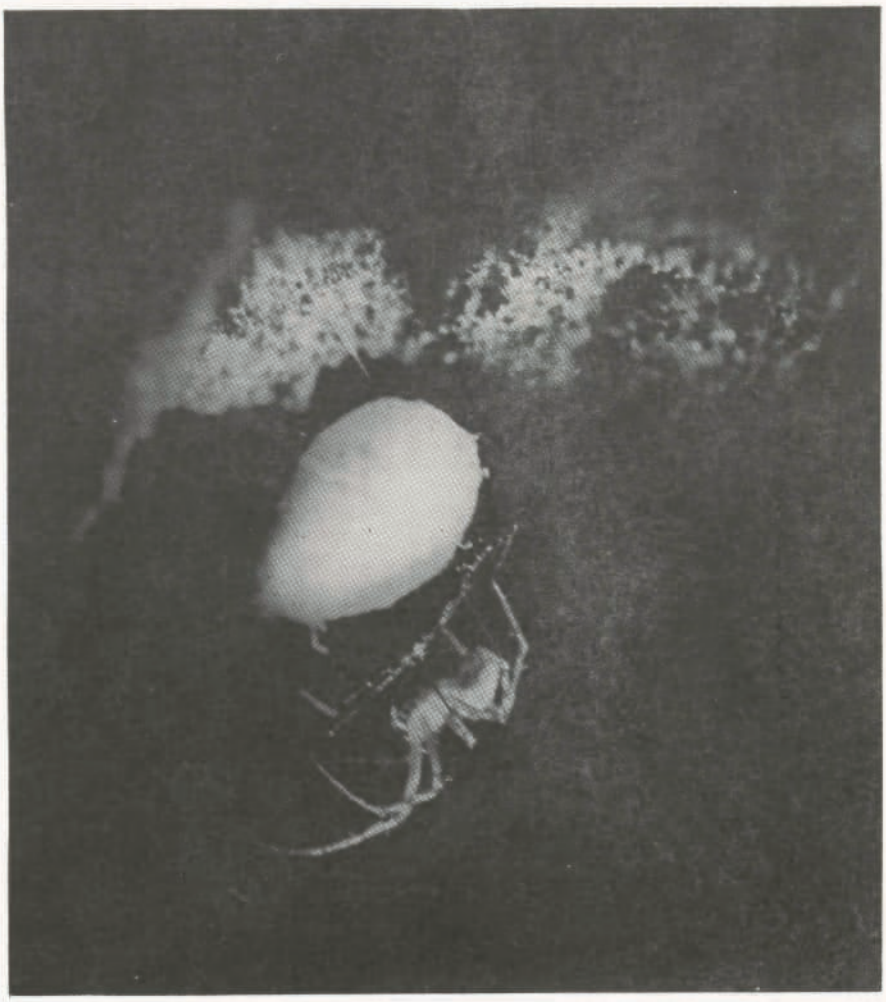
We got a good nights rest after our return at the Banito. The Banito was a campground south of Ciudad Valles basically for gringos with Winnebagos. The Banito was to become our headquarters for the rest of the trip. We spent the next morning cleaning and reorganizing our gear. We relaxed that afternoon by visiting the mountain town of Xilitla, as Sunday was market day. Here our group acquired the necessary hats and machetes required of all serious cavers (gringo tourists). The next two days were spent dropping two easy pits in the Xilitla area, Sotano de San Antonio (399') and Sotano de Huizmolatitla (340').

Next on the agenda was crossing the border. The Mexican officials were very quick and the Americans were even quicker. (A complete search of the truck would have taken days.) The next stop was Austin, Texas for an oil change and lube job, with a 3-hour excursion in the Whole Earth Store. The store was a general store for outdoors people, based on the Whole Earth Catalog series. The store was full of books and gear for almost any activity. Finally the next day, Saturday, January 4 at 12:00 we arrived in Lexington, having completed in our estimation, a very successful trip with the earnest desire to return someday.



CAVE CRICKET

Photo by Pete Miller



Cave Spider in it's natural environment.

Photo by Pete Miller

Take Nothing But Pictures, Kill Nothing But Time, Leave Nothing But Footprints.

SWORCA Limits Access to Caves

At times there are simply too many visitors to a cave. Ideally we all wish that there were no cavers, but conservation-minded ones or better yet, no cavers but those in our own group. Not saying our group is perfectly free of hurting caves by putting an occasional muddy footprint on clean flowstone, but simply that the fewer visits the better. Eventually a point is reached where someone must put a foot down and say unless traffic is stopped, irrepairable damage will be done. This applies especially to caves with delicate formations and/or endangered creatures.

John Clark asked SWORCA'S help to limit traffic to Clark's Formation Cave (Question Caverns) and suggested a gate. We hinted that we might be able to assist in the building of a gate but so far the traffic has been selective enough that the gate was not required.

One of Indiana's most photogenic caves, Jewel Box, has been gated a number of times only to be broken into. After seeing the fantastic formations and not seeing anyone rebuild the gate for more than a year, several SWORCA members wrote persistently to the Indiana State Park System for permission to build a gate at our expense. The rangers denied our request and said that they would take care of it. Several letters and phone calls later a gate was built by the park service. The whole process took about three years. It now costs $2 per caver to visit Jewel Box.

It is better to keep a secret than to gate a cave, but once traffic gets out of hand, regretfully steel and concrete is the only solution.

Caver's Quotes

It can't be that difficult, EVEN MARV can do it!

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"TRAPPED" 24 Hours by Flash Flood

"Cool" Thinking Prevents Disaster for 3 SWORCA Members

By Werner Jud

This is an account of 3 SWORCA members and the cave that has left an indelible impression on them.

Goochland, which is in Rockcastle County, Kentucky, is a very important cave to SWORCA—it is their "System." Many, many weekends have been devoted to its exploration and mapping along with the mud, water, dampness, exertion and all those other enjoyable caving aspects.

On Saturday, November 30, 1974 Pete Miller, Richard Sellers and Werner Jud prepared for another hard trip into Goochland. It was like the many other weekends except perhaps that a couple of extra people would have been more usual. In the past 2 months, SWORCA had found new passage deep inside Goochland and had set up a small camp area, which at that time, merely consisted of some food, a kerosene lantern and a little plastic.

The weather was very bleak and chilly that morning with drizzle and heavy overcast. Richard commented on possible water rise while we would be inside the cave. Pete and Werner agreed but ..."we've got to map these new finds and do a good exploratory trip," had been the reply.

At 11:30 a.m. the three entered Goochland. Approximately 1½ miles of cave had to be penetrated to arrive at the new passage. Most of the distance was walking stream passage, but two demanding breakdown piles had to be crawled through. Basically it was hard caving even before they got to their destination.

Mapping commenced from the designated area and plans were to continue mapping to the camp, then explore. They didn't know then, but Goochland was about to have its discoveries paid for and three cavers were up for the first bid.

In the late afternoon the trio was standing on a rock ledge about 20 feet above the stream level. They were watching the stream, it acted unusual, a lot of movement ...Richard dropped the tape and started heading out at top speed, warning the other two of the impending danger. Pete and Werner didn't or couldn't believe it, until after following Richard a short distance, noticed a dirt ledge they had seen on the way in. At that time, about 9 feet of its face was exposed out of the water. Now only about 6 feet was exposed. The water was coming up extremely fast, Goochland was flooding.

One must remember that the three had caved hard for about 7 hours and the cold and hunger were mounting up. With adrenalin pumping, they raced back, fearing a low section in a breakdown pile would be siphoned. Richard was in front followed by Werner, then Pete. There was an element of panic, but as a group they were able to remain in control. As feared, their exit crawl was siphoned, by about 4 feet. They were trapped, sealed from the outside world. They had to get back to the last mapping point and then to the camp, which was on the upper level. The water was still rising and the danger was not gone until they were on high ground.

When they at last arrived, each was totally exhausted and wet from the flood water and perspiration. The next 6 hours at "camp" were insufferable. Huddled together under plastic, they crowded around a sterno can for warmth. After the fumes became too noxious they traded it for a kerosene lantern, which didn't quite have the heat output. It didn't matter anyway, since all were freezing from condensation of the plastic on their backs. About 5:00 a.m. November 31st., Werner, being totally stiff with cold and cramps, found the situation unbearable. He told the others he would go down to the stream level and see if the water had retreated enough for an exit. He said he would return in a half hour or so. Pete and Richard were still miserably huddled together and to make matters worse, Richard had been coming down with a cold, that could have passed as phthisic-fybrosis.

Werner climbed on down having visions of being swept away by a raging underground river. Reaching a certain point he could definitly see the water had dropped about 3 feet, but it was still at an abnormal height.

Returning to camp it was joyously announced that they could leave. They celebrated with freeze-dried chicken & rice, consuming the "tasty" pasty mess with mostly ... will power. That to had a price to pay and their intestines paid the price.

They left camp fatigued, hopeful, but primarily worried if the water was low enough to clamber through the breakdown. After two endless hours of caving and anticipation, they arrived at this low point. There was one inch of air space.

The thought was as frightful as the sight. Going back to spend another night was unthinkable. Besides the water may come up again and seal them in for days.

After some procrastinating, Werner entered into the water and promptly went into an uncontrollable shiver. He yelled he would check ahead to see if the passage beyond was passable. Voice contact was lost. He started crawling in the breakdown above the water. Pete and Richard then entered and were also looking for a way out. Visions of water sealing them in the breakdown created thoughts of a limestone tomb. The exit side of the breakdown was still found to be siphoned, but after a half hour of separation, Werner yelled of an upper route leading out. Richard and Pete followed and they finally completed the first and worst section. The outside was now only a little over a mile away.

The trio trudged down the stream passage which was the vision of a raging underground river come to life. A few spots with low ceiling height were eating on their brains on the way out, but all had enough air space to be passable. One natural advantage for them was that they were moving downstream. After passing over the top of one more breakdown pile the exit was at last guaranteed. Outside 3 inches of snow was lying on the ground and the temperature was 20 degrees. They changed, ate and drove home, arriving late Sunday night ... Just like any "typical" weekend of "ordinary" caving.

Of the many questions, observations and conclusions that may be drawn, this can definitly be said: the trip had put endurance, composure and caving ability to an absolute test. Each facet had to function at a paramount level. Panic would have meant chaos, chaos would have meant distortion and all of that put together would have meant death!

If you, as a caver, find yourself in a situation like this, don't panic. If you find it difficult to control yourself look for the control in your buddies. (This is assuming they are in better mental shape than you are.) Nevertheless as a team you can help one another and find strength. This is what makes any cave trip a safe and memorable one.

Incidentally in case the reader hasn't already got the message, don't go in caves that are prone to flood during an impending rain. You may not be as lucky as the Flash Flood Trio were.

The trio are now known as:
Werner Jud (Sunshine Caver)
Pete Miller (Clear Water)
Richard Sellers (Blue Sky)

Personality Test

(Some inside SWORCA Humor)
By The Editor

See if you can guess these famous personalities associated in some way with the caving world, by some direct quotations:

1. "Man oh Man! Ya gotta PUT OOOOOOUT!"
2. "Gabage! It's a P.O.C.!"
3. "It's wall-to-wall lake! (splash, gurgle). You think you're cold now. BACK OFF!"
4. "What? How could a Minespot fail?"
5. "I gee ya all a hur a Hrooged Hreeg!"
6. "Oh, I'm sorry there Wana, I just shook your hand real gentle like. Didn't mean to crush it."
7. "There'll be some good preachin and some good singin!"
8. "You just Cain't Meice It!"
9. "Why Lordee, he's down at the "Blue Moon."
10. "You boys know there's a $100 reward for whoever turned the water green?"

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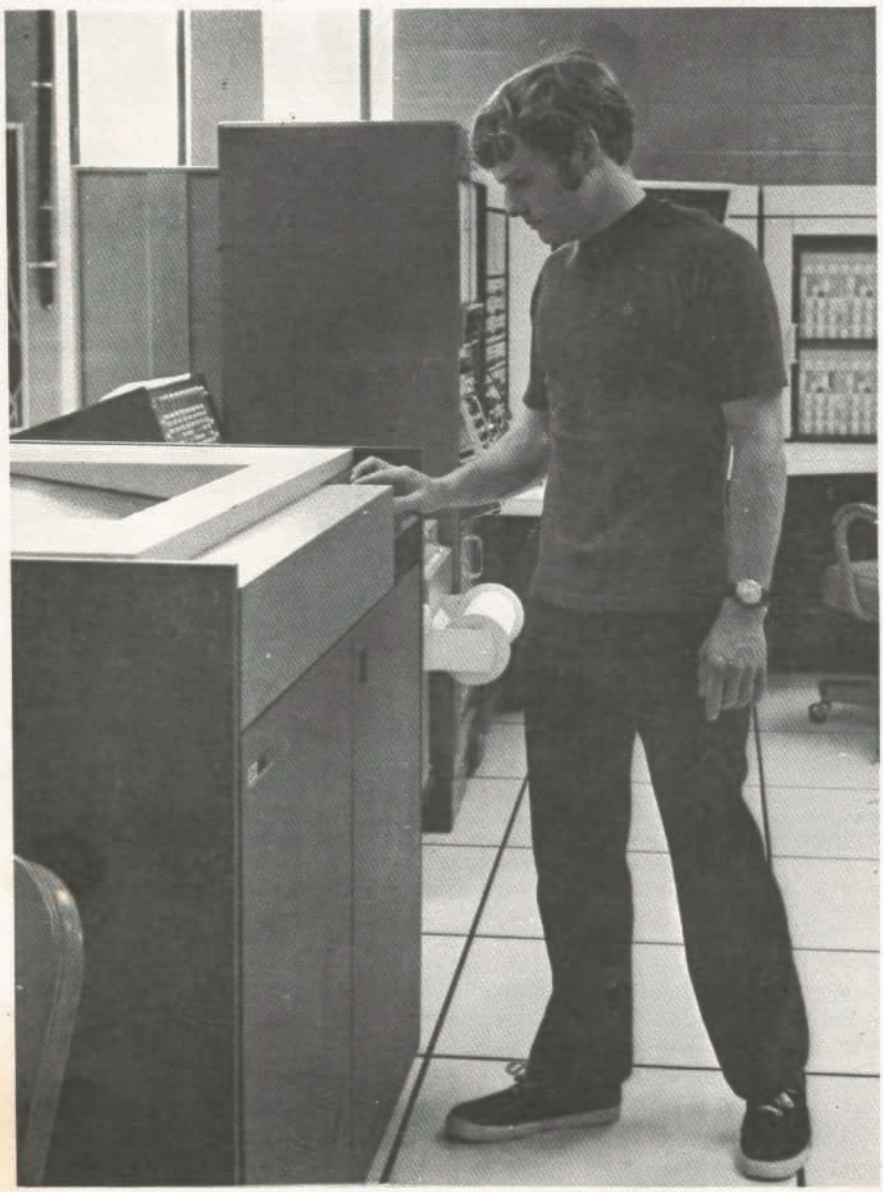
The Amazing "Caveplot" Computer System

By Richard Sellers

In Cincinnati we of the caving community are fortunate. Not only are we within a few hours drive of some of the finest caves in the world, but we are only a matter of a few moments drive from one of the finest computer controlled electronic plotter boards in the country. In the new engineering facilities in Rhoades Hall of the University of Cincinnati is an IBM 1130 hybrid computer system available for students (and other) use, which is tied in with a mammoth -sized Calcomp Plotter approximately 4 feet by 7 feet.

In 1973 John Evans, Alan Scott and I resolved to utilize this facility for translating raw cave survey data into an accurate picture of survey lines and wall points, thereby saving countless hours of hand plotting. We also hoped eventually to prove that a computer could be trusted to take over ALL plotting for SWORCA surveys, even though computers have been accused of certain inborn disadvantages.

At this point in time I can confidently say that our "Caveplot" system has not only replaced hand plotting, but to return to the manual method would be a waste of time. The caveplot system can handle maps 4 feet by 7 feet, up to as many stations as required in steps of 1000 points. The accuracy is within .001 inch (smaller than the pen width). Angles of inclination are corrected automatically and each time you run the program you get an accurate printout of all survey data. The map size may be changed to any SCALE by changing only one number. A topographic overlay of say 400 points condensed into a few inches would be almost impossible by hand, but takes only 3 or 4 seconds on Calcomp and the 1130. Other information like standard deviation, depth below entrance station, general trend of passage, etc. may be acquired also very easily. As long as the programmer inputs data correctly, the computer will not err.



Waiting for a printout on the 1130 Hybrid.

How the System Works—

Basically we have a two-step process. First we type in data on the large IBM370 at U.C. and get a printed and punched output. Second, using that punched output we plot the cave on the 1130 hybrid and Calcomp. It is possible to map over the weekend and type data Sunday night. The cave may then be plotted the next morning. (In reality we're not that fast because we're usually wiped out Sunday night!)

The input data includes a compass reading, tape distance, clinometer reading, left wall, right wall, ceiling, floor, code to indicate an approaching junction. Plotting is always relative to the previous point, unless the junction code is used to lift the pen to a junction point. With this system any combination of ,junctions, multiple junctions, closures, etc. may be plotted, however this is the trickiest part and must be done carefully. After two years of practice with this system we are confident in its reliability and we have verified our most ambitious venture, the Goochland System (nearly 900 stations), with several cave radio points on the topo map and closure to the Poplar Pit entrance. All our plotting has agreed very closely with the control checks I have mentioned.

Taking visual sightings between cave radio points (if possible) or surveying overland between cave radio points is another good check on accuracy. Our SWORCA surveys are done with a steel or fiberglass 100-foot tape, an all-aluminum cased "Super Sunto compass and Sunto Clinometer (available from Forestry Supply Co.)

As far as the wall points are concerned, the computer puts a dot (with a circle around it) at each left and right wall, measured perpendicularly from the previous survey station. The sketch person then connects the dots and adds information via the survey notes. Mary Gratsch does this, then passes the first draft on to Tim Kettering, who does the final artwork in ink on Mylar plastic. This is a neat, durable and easily reproduceable method.

We feel this is one of the best systems going. We have brought it out of the state of the ar t stage. To us "Caveplot" is a tool, a utility. We are not as efficient without it.

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Carbide Caving

By Marv Knasel

I have been asked to write an article on "Carbide Caving" and especially "Care of the Carbide Lamp" which I will now attempt to do.

First of all, the three essential items needed for carbide caving are as follows:
(1) Water
(2) Calcium Carbide
(3) A Carbide Lamp

Of these three items, water is the most easily obtainable.

Calcium carbide can be obtained at most hardware stores for a reasonable price. The carbide usually comes in a 2-pound container.

A good brass carbide lamp is not as easy to find. It is my own opinion that the Premier Lamp made in Britain is a fair lamp, but by no means comparable to Justrite or Autolite. My main objection to this lamp is the reflector, but then everyone is entitled to his or her opinion.

Calcium Carbide (C_aC_2) is manufactured by heating pulverized limestone or quicklime with carbon. In a carbide lamp this chemical is changed to another chemical, acetylene gas (C_2H_2) by the addition of water.

Acetylene gas is a highly flammable, colorless and explosive gas. It is used mainly for welding and cutting, but can also be used as an illuminant.

I cannot stress enough the need for proper care and cleaning of the dependable carbide lamp. It just takes about 15 or 20 minutes after each trip to thoroughly clean each lamp. Each person goes about this differently. Each person also gets the same end result; a dependable, rugged and functional light.

The steps I use to clean my lamps are simple:

(1) I never leave spent carbide in the bottom.

(2) I always clean the outside as well as the inside of my lamp with a brass cleaner called "Brasso."

(3) The reflector is also cleaned with this brass cleaner, but care should be taken so as not to scratch the reflector. A soft non-abrasive cloth should be used.

(4) Always change or clean the filter.

(5) Make sure the tip is clean and free of carbon build-up. A tip reamer works wonders at this.

(6) Always carry spare parts, tip, filter, etc. in your cave pack with you. All the spare parts in the world don't help if they are back at the car.

(7) A tip cleaner worn around your neck on a chain or string is a worthwhile bother.

I hope this article has been of interest to it's readers. Good and Safe Caving to all of you.

T'was The Night Before Caving

by Werner Jud

T'was the night before caving and all through the gloom,
Not a caver was stirring, there just wasn't room!
The gear was all packed in numbers so great,
We feared that the car would collapse from the weight.
Forward we drove on this route many times,
Waiting to cave as we cross county lines.
Arriving at last to a familiar Quadrangle,
Cavers prepare to unload, with gear all a tangle.
When out in the night there arose such a clatter,
I looked all about to see what was the matter.
When what to my flickering light should appear,
But the grungiest cavers and all their cave gear.
As the numb group approached us, saying no words,
I knew in a flash these were no Nurds!
More slower than snails, these gung-hoers came,
One groaned and moaned as he called them by name.
On Miller, on Marvin, on Sellers, on Jud;
On with your coveralls, covered with mud!
Now Mary, now David, now Johnny and Tim ,
Forward you truck with headlamps so dim.
Then hardly a word did they resperate,
Just merely sat down and ate, an ate, an ate.
Hunger subsided and from mud somewhat free,
They crawled in their sacks and sort of looked at me.
But I heard one exclaim as he doused his dim light,
"Nurdy caving to all and to all a goodnight!!!"



I DON'T LIKE THE LOOKS OF THAT ENTRANCE, JOE

Caves—by Dave Harris

What secrets do caves hold for me? What unseen beauty is hiding in its depths? What life can I find in this land of Darkness?

Does it hold many riches, or scarred and mangled formations that some careless person broke ? How many miles must I go? How many pits must I go down? How many streams must I wade?

To find a place that's mine, that nobody else knows of, a place where I can sit and talk to wise, old stalagmites. Listen to the silence and the occasional drip, drip, drip. A place unmarred by carbide flames or spray cans.

To find a place like this is my dream, and to protect it from all invaders which will destroy my dream world.

This place does exist, it exists in my mind, and I can go there when ever I want and you can go to yours.

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Prehistory of the Rockcastle and Jackson County Cave Regions

By Ken Tankersley

The beautiful karst countryside of Rockcastle and Jackson Counties has not always been peppered with sinks or opened its hills to the vast subterranean underworld. The caves we come to know and love were once formed under a vast ocean that existed during the Mississippiam Period of the Paleozoic Era (310-325 million years ago) This is not to say that the actual caves formed at this time, but the sediment that formed the limestone that the caves developed in, was deposited. Organisms that lived in and around this vast ocean include the following, which are represented as abundant or characteristic fossil groups.

Fusuline Forams	Arachnids
Rugose Corals	Crinoids
Conularoids	Blastoids
Cryptostome Bryozoa	Perichoechinoids
Clonetoid Brachiopods	Conodonts
Productoid Brachiopods	Sharks
Davidsonioid Brachiopods	Amphibians
Athyridoid Brachiopods	Lycopods
Spiriferoid Brachiopods	Sphenopsids
Goniatite Ammonoids	Seed Ferns
Insects	Cordaites

These fossil groups bespeak the time and environment in which they lived. The paleo ecology can be reconstructed through good exposures of the fossil record in many caves of the area. A good example of this is the caves of the Crooked Creek Cave Region of Rockcastle County. Here a paleo bioherm of Litho Strotionella Tetracorals can be observed. Within the entrance of Goochland Cave the Tetracorals are so massive that their chert replacement has formed a resistant layer forming the present ceiling of the "Twilight Zone" portion of the cave.

These corals can also be seen in caves near the Mt. Vernon area. Pine Hill and Sinks of the Roundstone are excellent examples. The Archimedes Bryozoan can be seen in the Tight Mother Cave section of the Cave Springs Cave System of Jackson County. At the bottom of Jingle Hole, brachiopods and pelecypods can be seen on the pit walls. Blastoids, Gastropods and large crinoid stems can be observed on the walls of the "Crinoid Canyon" in the Big W Cave.

Many caves in this region hold exposures of the fossilized past. Smokehole, Thomas Owens Saltpetre Cave, Skull Pit, Crooked Creek Ice Cave, Mullins Springs, Climax, Pebble and the Cave Ridge Caves are just a few among the many fossiliferous caves of the region.

Between the Carboniferous Period of the Paleozoic Era and the Pleistocene Epoch of the Cenozoic Era there exists a large hiatus. The sediments were either eroded away or not deposited. The Pleistocene also has left a fossil record in the caves of the Rockcastle and Jackson County Cave Regions. Remains of fossilized mammals often appear in the entrances of certain caves. Besides the actual remains, Coprolites have been known to exist within certain caves. Rampart Cave has been left with excellent fossilized ground sloth dung. Fossil Peccary are among the most common Pleistocene fossils found within the caves. These fossils date up to 20,000 years of age. By 13,000 B.C. man appeared on the scene.

Archaeologists today have divided certain cultural sequences of Eastern North America into stages and periods according to time. This enables one to sort advances of culture according to time. The oldest stage is the Paleo-Indian. Man of this culture inhabited Eastern North America between 13,000 B.C. and 8,000 B.C. By the time Paleo-Man made it to Rockcastle and Jackson Counties he was manufacturing projectile points resembling the Clovis-Fluted. These points are 12,000 years old. Digs within cave entrances will find these artifacts at the lowest artifact-bearing layer. Most points have been associated with mega fauna yeilding good distributional studies.

The next stages of man in the area are the Archaic's. The Early Archaic period lasted from 8,000 B.C. to 6,000 B.C. Man at this time was hunting bison, elk, bear and small game. Large cave entrances are great locations for sites. Thebes, Kirk and Dove Tail points are several projectile points associated with the early archeac excavations. The Middle Archaic period lasted from 6,000 B.C. to 4,000 B.C. Excavations from this time yeild the appearance of ground stone tools, bone tools and the spear thrower. Mussel shells are often associated with this layer. The Late Archaic lasted from 4,000 B.C. to 1,000 B.C. It is often characterized by the use of Atlatl plates. These are often called banner stones. They were used as spear throwing weights and often associated with burials of importance. Copper was known by this time and marine shells were traded. Red Ochra was used along with soapstone steatite and bone. Micro tools are seen at this layer along with artifacts produced from the Harrison County flint. Jackson and Rockcastle Counties abound in rock shelters that exist in the sandstone that caps the hillsides. These are ideal places to begin a dig. Indian Rock House is an excellent example.

The Central Sinks have yeilded many archaic artifacts. An interesting note I would like to add is that they are identical in composition to the chert modules of Wind Cave a mile away. Mr. Lakes, former owner of Big W Cave turns up archaic artifacts yearly. The site is located in front of the cave and is well exposed. John Abrams, owner of the Cave Springs Cave System, also turns up archaic artifacts yearly. The site here is located just to the right of a karst window. The cave probably served the people as a water source. Man of the Archaic Stage was in this cave region and did make use of many caves. Caves we thought to be virgin were known 9000 years ago. Man has been attracted to caves since the beginning of his existance.

The next cultural stage is the Woodland. The Early Woodland period (Adena) existed from 1000 B.C. to 300 B.C. The Woodland saw the shift from hunting to agriculture. Also the beginning of house building. No longer are the caves used for shelter, yet the cultures did remain in the cave areas.

The Middle Woodland Period (Hopewell) existed from 300 B.C. to 450 A.D. This was followed by the Late Woodland Period that existed between 450 A.D. to 800 A.D. or contact with Europe. Between 800 A.D. and European Contact Cultures in the area saw influences of the Mississippian Stage.

By the 1800's the blind karst valleys of the area were being settled for farming. The area of Wind Cave was settled by the Lakes family in 1840. Many log cabins still remain in the area and bespeak the long forgotten past. By the 1850-60's the caves of Rockcastle and Jackson Counties were being mined for Saltpetre. During the 1880's and 90's the area was being surveyed for its great mineral resources, namely coal. After the turn of the century and the over-mining of coal, man started mining limestone. Today we find ourselves in a hush from the busy past. We know the area as a tranquil retreat that leads us to the discoveries in the unexplored underground we so love.

Photo Light For Caving

To build a 2000 watt photo light source all you need are four DLS or DLG projector bulbs available from most discount department stores for about $8.00 each. Use standard CZA type projector bulb sockets available from projector repair shops. To power the system use 17 or 18 Ni-Cad batteries in series. (See ESSE Surplus Co.) This system will work well with Kodak tungstin films. (Balanced at 3200°K) 10-ga. wire is needed to handle total current. 18-ga. will suffice to each individual bulb. Use one switch for each bulb. Switches should be rated at 10 amps, 25 volts D.C. (or better).

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Karst Formation in Jackson and Rockcastle Counties

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By Ken Tankersley

Stratigraphy

The following is a listing of geological series, formations and members involving Karst Formation in Jackson and Rockcastle Counties.

The first limestone affecting karst development is a yellowish gray dolomitic limestone of the Renfro Member resting above the Nada Shales. Both members belong to the Borden Formation in the Mississippian Series. Above the Borden rests the Newman Formation. This is the main formation influencing cave development. The formation is made up of the following Members.

The St. Louis Limestone Member is a brownish gray fossiliferous limestone. Certain sections are abundant with Lithostrotionoid Corals. Caves forming along Crooked Creek in Rockcastle County show excellent examples of these Palio Corals. The Ste. Genevieve Limestone Member is an olive gray limestone often found containing chert modules. The remaining Newman Formation is made up of the Upper Member. This is a sequence of light gray shales. This completes the cavernous Mississippian Series. The caprock above cavernous limestone is the Lower Pennsylvanian Series. This involves the Pennington Formation (once known as the Rockcastle Conglomeratelentil) made up of sandstone and shales of the Livingston Conglomerate Member. Above this the Lee Formation can be found with the Corbin Sandstone Member.

Jackson and Rockcastle Counties lie within the Appalachian Basin east of the Cincinnati Arch. Their limestones are highly cavernous and often mineable.

Observeable Factors Influencing Cave Formation in Jackson and Rockcastle Counties

The Newman Limestone outcrops at various elevations in different portions of the counties, thus producing two major karst systems. One type is known as the "Valley Bottom Karst Drainage System." Here limestone outcropping the valley bottoms give way to solutional erosion. Drainage is subterranean except in times of high discharge; in this case the surface takes part of the flood run-off. Swallow holes and dolines of this system readily fill with alluvium. Drainage appears to be carried by solutional tubes which are not large enough to permit physical entry. The Valley Bottom Karst Drainage System is characterized by dry stream beds (except in times of flood run-off), massive amounts of dolines (alluvium filled or just big enough to accept flood drainage), and small swallow holes often with large sinklike depressions formed by water ponding before entry into the drainage system. Although this system can be found throughout Jackson County, several good examples are observeable in the Morril Drainage System or the Central Sinks near Wind Cave.

A second karst system occurs when the cavernous limestone of the Newman outcrops the hillsides. Throughout Jackson and northern Rockcastle Counties the limestone lines the hillsides. The caprock above the limestone is a conglomeratic sandstone, Pennsylvanian in age and attains a thickness over 300 feet. The caves parallel the ridges, yet never extend under the caprock where it is thicker than the cavernous limestone. In many other areas caves have been found to extend under a sandstone caprock yet the caprock in those cases were less than cave. or equal to the host limestone of the In Jackson County the carprock is three times the thickness of the cavernous limestone. It seems that this controls cave formation to a point of termination. The caves will extend under the sandstone until the caprock becomes thicker than the cavernous limestone. Using this ratio between the thickness of the sandstone caprock and the limestone, one may define the bounderies of cave formation in Jackson and Rockcastle Counties.

Summary

In areas where the sandstone caprock is less than the thickness of the limestone, caves may extend under the caprock, and often appear to do so. An example of this is the Sloans Valley Cave System of Pulaski County, Kentucky, where there is a dominant caprock (the sandstone carprock thicker than the cavernous linestone), the caves will not extend under sandstone ridges at this point of thickening.

When the caves lie within the boundaries of caprock thickening and hillside outcropping the caves take on a linear appearance, following the rldges often with many dome pit occurances. A good example of this is the Big W Cave System. At no place in Jackson or Rockcastle Counties is there an example contradictory to the above statement.

Theories

We know that soluable rock, precipitation, verticle and horizontal fractures in the soluable rock and a head or gradient for hydrolic flow controls cavern development. At the present there is no apparent reason why caves shouldn't form in the limestone under the caprock.

One note to observe is that the Valley Bottom Systems are recent karst formations. After periods of erosion they will represent the hillside caves. In other words, the caves at higher elevations on the valley slopes represent old, abandoned Valley Bottom Systems. Reasons for caves paralleling ridges may be an interaction of subsurface gradients where piracy may be used to attain the base level through a ridge parallening cave system.

Because limestone has been exposed on the valley slopes it is only natural that solution will occur paralleling the caprock. Water coming off the caprock entering najor joint systems will form massive dome pits. Major joints often parallel the valleys. Therefore caves using joint systems would also parallel the valley. In areas where there is a thin caprock there are excellent possibilities of permitration into the soluable rock for cave development along major joints. In areas of thick sandstone the joints are not large enough to permit penetration of caprock to permit solution, therefore the cave forms along and paralleling the ridge not beneath a thick caprock.

There is probably no single source; it is probably due to a number of causes. Therefore these hypothesis's are to be viewed as "multiple working," one interacting with the other.

Joint studies and dye tracing still need to be done.

Fluorescein Water Tracing Data

Johnetta Quad

1. (Input) JCC 29 Tight Mother Sink
(Resurgence) JCC 28 John Abrams Cave (Cave Springs)
Linear Distance 275 ft. . . . . Drop 20Ft.

2. (Input) JCC 12 Lakes Cave
(Resurgence) JCC 91 Lakes Cave Spring
Linear Distance 650 ft. . . . . Drop 45 feet

Lieghton Quad

3. (Input) JCC 42 Big W Cave
(Resurgence) JCC 100 River Styx Spring
Linear Distance 3000 ft. . . . . Drop 60 ft.

Alcorn Quad

4. (Input) JCC 56 Sinks
(Resurgence) JCC 55 Rises
Linear Distance 1500 ft. . . . . Drop 20 ft.

5. (Input) JCC 77 Tommy Cave (Durham Cave)
(Resurgence) JCC 110 Durham Springs
Linear Distance 450 ft. . . . . Drop 40 ft.

6. (Input) JCC 109 Cliff Bottom Cave (Falls Entrance)
(Resurgence) JCC 110 Durham Springs
Linear Distance 650 ft. . . . . Drop 100ft.

7. (Input) JCC 109 Cliff Bottom Cave (Falls Entrance)
(Resurgence) JCC 102 Cliff Bottom Cave #2
Linear Distance 800 ft. . . . . Drop 100 ft.

Cave Interface with Shale

Several cave formations seem to result when a cave stream finds a shale strata. The first can be seen from the cave system stated in dye experiments number 3. Here the stream cuts through the Newman layers to a unit of

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shale. The cave, paralleling the ridge is thus terminated (the stream follows the shale unit, staying on top of it, and resurgence occurs on a hillside hanging karst spring). The same formation occurs in Jackson and Rockcastle Counties. Another good example is the Wind Cave System of Jackson County.

A second cave formation occurs when a relatively small volume of water within a cave reaches a joint-controlled passage at the top of a shale unit. The saw-like erosive action of the small stream channeled by the joint-controlled passage cuts into the shale. It eventually forms a canyon-like passage with the shale unit as part of the walls. This formation occurs in the cave system mentioned in dye experiment number 2. It has also been seen in Mammoth Cave and Indiana Caverns.

The third and final cave system formed with a shale infulence is the type seen in the Sinks and Rises Cave System mentioned in dye experiment number 4. Here there is a large volume of water flowing through a cave passage. When the flow reaches the shale unit the gradient is lowered and the stream meanders on top of the shale unit rather than cutting into it.

Summary

Three types of cave formations have been observed in Jackson and Rockcastle Counties due to a shale influence.

1. Termination of cave due to passage interface with a shale unit.

2. Small volume stream flowing in a joint-controlled passage reaches a shale unit. Stream cuts into the shale unit continuing a joint formed passage in a shale unit.

3. Large-volumed stream reaching a shale unit meanders on top of it rather than cutting into it. This also lessens the hydrolic gradient of flow.

Work in Jackson and Rockcastle Counties

In 1891, G. M. Sullivan, working for the Kentucky Geological . Survey did a report on Jackson and Rockcastle Counties. In his geological survey of the area he found and I quote "The St. Louis group in this region is cavernous; there being many caves, some of them of considerable extent. The creeks in many places, where their beds have been cut in this rock, have underground channels, the surface channel being dry except in times of high water. This is the case on the upper waters of the South Fork and the lower War Fork of Station Camp, and on parts of Horselick."

Little work has been done in the karst regions of Jackson and Rockcastle Counties since Sullivan's 1891 survey and 1973. More work is being done, yet much is still needed. The following introduction lists a survey of caves taken in Jackson County. Due to their recent discovery many may appear virgin. Before naming a new cave, checking with past surveys should be done to prevent confusion and keep surveys accurate. Your new discovery may be hidden under a different name already in an established survey. Communication between surveys and solo groups cannot be over emphasized along with cave conservation. Share your ideas and finds with other reliable sources so a better understanding in Speleology can be made. (Cavers helping Cavers for a better understanding of Caves.)

Introduction to the Cavernous Karst Lands Forms of Jackson County, Kentucky

Within the limits of Jackson county many cavernous features are exhibited. The following is a list of over 108 caves, karst drainage systems and sink holes, taken in the past two years. They are listed in order of cave population within a geological quadrangle (seven and a half minute) put out by the United States Geological Survey. Out of 11 quadrangles in Jackson County, 7 are cavernous and show karst development: Bighill, Alcorn, Leighton, Johnetta, Sandgap, McKee and Tyner. The caves extend from 30 ft. to over 6000 ft. in length. Karst Drainage Systems are from a few hundred feet to 8 miles in length. Sink holes range from a few feet to 150 ft. in depth. No cave system extends under a dominant caprock and many caves follow the ridges of the county for over 3000 ft. The survey was begun in September of 1973.

McKEE QUADRANGLE

JCC-89 COAL MINE SPRINGS AND SINKS

TYNER QUADRANGLE

JCC-92 ALUM CAVE

BIGHILL QUADRANGLE

JCC-9 MORRIL DRAINAGE SYSTEM
JCC-90 MULE SINK
JCC-7 CLEMONS CAVE
JCC-1 GARRET CAVE #1
JCC-2 GARRET CAVE #2
JCC-3 KELLEY'S CAVE
JCC-4 SIMILAX CAVE
JCC-5 TOM CAVE
JCC-6 TESER SINKS AND RISES
JCC-8 STATION CAMP SINKS

SAND GAP QUADRANGLE

JCC-48 CLOVER BOTTOM CAVE #1
JCC-49 CLOVER BOTTOM CAVE #2
JCC-50 MUD CAVE
JCC-51 OLD BUMP CAVE
JCC-53 CLOVER BOTTOM CREEK SEPARATION
JCC-46 SWIMMING HOLE #2
JCC-47 NOT WORTH IT CAVE
JCC-52 ALCO CAVE
JCC-44 SAACS CAVE
JCC-45 INDIAN CREEK CAVE

JOHNETTA QUADRANGLE

JCC-10 BOWMAN'S SALT PETER CAVE
JCC-13 HORSELICK CREEK CAVE
JCC-22 JOHNSON SCHOOL CAVE AND RISE
JCC-23 RICE CAVE
JCC-24 DOUBLE SINKS CAVE
JCC-25 ROUND SINK
JCC-26 WORM HOLE CAVE
JCC-28 JOHN ABRAMS CAVE (CAVE SPRINGS)
JCC-29 TIGHT MOTHER
JCC-16 THOMAS OWENS SALTPETRE CAVE (RCC)
JCC-11 JOHN HENRY
JCC-21 PONYLOT SINKS AND RISES
JCC-27 VALLEY SINKS
JCC-12 LAKES CAVE
JCC-91 LAKES CAVE SPRING
JCC-14 UNAMED CAVE
JCC-15 JOHN GRIFFEN CAVE (CLOVER BOTTOM CK. CAVE)
JCC-18 RISING SINK
JCC-19 ARROW SINKS
JCC-17 RISING WATER SINK
JCC-20 NOWHERE SINK
JCC-115 LUMBER JACK CAVE

LEIGHTON QUANDRANGLE

JCC-28 BIG SPRING CAVE
JCC RUSSEL CAVE
JCC-31 COXS CAVE
JCC-93 SILVER MINE CAVE
JCC-33 HOPPER CAVE
JCC-34 ABNER CAVE
JCC-35 UNAMED CAVE
JCC-30 WIND CAVE
JCC-38 BACK DOOR CAVE
JCC-94 WIND CAVE SPRINGS
JCC-39 SPIDER CAVE
JCC-37 BIG RAT CAVE
JCC-95 SALTS CAVE
JCC-32 WIND CAVE PIT (WING CAVE)
JCC-96 WIND CAVE KARST WINDOW
JCC-98 JEE JE CAVE
JCC-40 CHURCH CAVE
JCC-97 ICE PIT
JCC-99 GARBAGE PIT
JCC-41 CENTURY SINKS
JCC-43 MILL SEAT SINKS
JCC-42 BIG W CAVE (RIVER STYX)
JCC-100 RIVER STYX SPRING
JCC-36 CEDAR POST CAVE

ALCORN QUANDRANGLE

JCC-79 JINGLE HOLE
JCC-55 RISES CAVE
JCC-56 SINKS CAVE
JCC-67 BLOWING SPRING CAVE
JCC-77 TOMMY CAVE (DURHAMS CAVE)
JCC-101 DURHAM SALTPETRE CAVE
JCC-102 CLIFF BOTTOM CAVES
JCC-103 COW CAVE
JCC-108 EVIL HOLE
JCC-58 FOG CAVE
JCC-59 HISEL CAVE (GUS)
JCC-104 ZOLA CAVE (BONE CAVE)
JCC-106 SUMP CAVE (PIT)
JCC-60 MELVIN HISEL CAVE
JCC-74 LAINHART CAVE #2
JCC-75 JOHN RODGERS CAVE
JCC-78 DOME CAVE
JCC-80 LESTER COLLINS CAVE #1
JCC-81 LESTER COLLINS CAVE #2
JCC-82 TOM ROSE CAVE #1
JCC-86 SINKIN VALLEY CAVE SYSTEM
JCC-61 MORNING HOLE CAVE
JCC-62 BIG HOLLOW CAVE #1 (SYSTEM)
JCC-63 BIG HOLLOW CAVE #2
JCC-64 BIG HOLLOW CAVE #3
JCC-65 BIG HOLLOW CAVE #4
JCC-69 (BILL) JOHNSON CAVE
JCC-71 NEOTOMA CAVE
JCC-84 KNOB SINKS
JCC-85 LOST HOLLOW
JCC-105 BARN SINK
JCC-87 DRY FORK SCHOOL CAVE
JCC-66 GHOST CAVE
JCC-76 MIDDLE FORK CAVE
JCC-83 TOM ROSE CAVE #2
JCC-68 VINEY BOTTOM CAVE (FLESH)
JCC-107 VINEY BOTTOM BARN CAVE
JCC-88 VINEY BOTTOM SINKS
JCC-70 SWIMMING HOLE CAVE
JCC-72 HICKORY CAVE
JCC-73 LAIN HART CAVE #1
JCC-109 CLIFF BOTTOM CAVE (FALLS ENTRANCE)
JCC-110 DURHAM SPRINGS
JCC-111 DISTANT CAVE #1
JCC-112 DISTANT CAVE #2
JCC-113 HISEL SPRINGS (TOM)
JCC-114 TILTED BED CAVE

Caver's Quotes

Revised from a popular song: "When the Nurds nurd out and the cavers keep cavin, I want you to know I CAVE!

Phantom Coveralls—You'll see them at various caves around the county nailed to trees (grim reminders of B.A.T.'s that weren't P.O.C.'s).

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The Calcareous Cave Deposits of Kentucky's Jackson, Rockcastle and Pulaski Counties

By Ken Tankersley

ABSTRACT

The calcareous cave deposits found in Jackson, Rockcastle and Pulaski Counties include cave coral, stalactites, stalagmites, flowstone, columns, draperies, cave shields, helectites, cave pearls and cave flowers.

Deposition of these minerals occur from depositional environments of water seepage, submersion, water flow and drippings. Deposition of the calcareous deposit occurs in each case by a release of CO_2. Growth of the crystals occurs on the outer surface of all deposits except the gypsum flowers. Here deposition occurs at the base of the formation. Out of 720 caves, 80%—65% show formations deposited in a running water or dripping environment. 15%—5% show formation of the deposits in a seepage or submerged environment. The remaining 20% are caves barren of formations.

INTRODUCTION

The host limestone for cavern development in Jackson, Rockcastle and Pulaski Counties is Mississippian in age. The cavernous section is restricted to the Newman Formation. This includes the St. Louis, Ste, Genevieve and Upper Member limestones. The limestone varies from sparsley oolitic to fossiliferous with chert preservation. According to USGS (1971, Bighill Geological Quad) the courser grained limestone contains large crystals of calcite. It is within the Newman formation that the calcareous cave deposits occur.

Sweeting (1973, pp.176-177) states that the principle mineral in the calcareous cave deposit is calcite. The majority of cave deposits are of the normal rhombohedral calcite crystaline form which is stable at ordinary temperatures. Certain cave deposits however are composed of the less stable orthorhombic polymorph aragonite. This mineral has been found to be around 16% more soluble than calcite in water and cave temperatures and therefore tends to be dissolved in water which is slightly super saturated with calcite. Limestones containing pyritiferous shale bands have been found in association with Gypsum Formations.

Holland (1964, pp.36-67) has found that the deposition in caves is caused by a reduction in the CO_2 pressure. This reduction is an overriding factor in calcite deposition. Only rarely is the Co_2 pressure abnormally small, when evaporation of water or temperature changes become effective.

As water passes through the joints and bedding planes of the limestone it picks up calcium carbonate. This calcium carbonate results from a dissolving of the limestone by a weak carbonic acid in the ground water. This percolation of ground water through the limestone eventually reaches the cave ceiling. Depending on the volume of the somewhat $CaCO_3$ saturated water, the rate of flow and the porosity of the limestone an action of flowing to dripping will result. Most formations as a result can be seen forming at the interface of a joint or bedding plane and the ceiling, wall or breakdown slab. At this interface the CO_2 content of the cave as Franke (1965, pp.89-95) has found, is similar to the free air. This causes CO_2 to be released from the percolating water. This release of CO_2 causes the deposition of $CaCO_3$ and the formation of calcareous cave deposits. Formations will vary from rates of flow, depostion, surface, humidity, percentages of saturated solution and amounts of impurities.

CAVE POPULATION

In 1972 I began collecting data on the cave populations in Jackson, Rockcastle and Pulaski Counties. As of 1975 I have collected the following data.

Jackson County	120 Caves (CA)
Rockcastle County	280 Caves (CA)
Pulaski County	320 Caves (CA)
Total	720 Caves (CA)

This data will be used to compute the percentages of particular cave formations found in the caverns of Jackson, Rockcastle and Pulaski Counties.

Calcareuous Cave Deposits

CAVE CORAL (Popcorn, Grapes, Globulite)

Cave Coral is the most common calcareous cave deposit found in this region. 80% of the caverns contain some form of this deposit. They form as irregular clusters of $CaCO_3$. One reason contributing to their dominance is the fact that they will exist easily in flooded chambers. (This may be due to their small size.) Early theories stated that the coral may have been caused by water seeping along cracks. According to Thrailkill (1965, pp.59) the cave coral has no tendancy to orientate itself vertically. They are deposited subaerially on cave walls, floors and on other cave formations. It is fed $CaCO_3$ by water seepage from behind, flowing down from above, splashing on the walls and is introduced by surface tension. The coral will form under seepage conditions. I have observed prime examples of this in the "Backdoor" entrance crawlway to Wind Cave in Jackson County, Kentucky.

STALACTITES

Stalactites are probably the most widely known cave deposit. 70% of the caverns contain some form of this deposit. The stalactite is easily identified as an icicle-like projection hanging from the ceiling. There are several stages in the growth of a stalactite. The stalactite is first caused by water dripping from the cave ceiling and is often joint-controlled. Water droplets may flow down a joint to the ceiling of the cave. Here it remains until its volume increases to a point where gravity takes over. At this point CO_2 is lost to the cave air and $CaCO_3$ is deposited. This deposit forms a small ring of calcite on the ceiling. As the saturated drops of water continue to fall the rings stack up (upside down) to form a thin-walled, hollow tube. The stalactite continues to grow as water runs through its center and deposits a ring of calcite at its tip. At this stage of growth the stalactite is called a soda straw.

Sweeting (1973, pp.178-179) states that the structure of the soda straw is simple. They are composed of nearly pure calcite and each stalactite behaves in structure as if it were a simgle crystal. Each time a new layer is added to the end of the tube the molecules arrange themselves in accordance to the pattern laid down during the deposition of the previous layer. In Big W Cave in Jackson County, Kentucky, I have observed soda straws over 2-feet in length. If the soda straw becomes plugged, deposition may shift to the outside. Here layers of $CaCO_3$ (sometimes with impurities) precipitate on the stalactites outer walls. Continuation of deposition results in the "Classic Stalactite."

STALAGMITES

One might think of a stalagmite as the brother to a stalactite. This is not to say you must have a stalactite to have a stalagmite. 70% of the caves in this region show some form of a stalagmite deposit. On appearance the stalagmite is usually larger than the stalactite. Stalagmites are found growing up from the floor while stalactites grow from ceiling to the floor. If the flow of water is too rapid for the formation of a stalctite or there is little deposition at the stalactite, a stalagmite may occur. Here the saturated $CaCO_3$ drops of water from above land on the cave floor. These deposits mount up one on top of another to form a horizontal layering. This causes the stalagmite to thicken vertically, which is an indication of an increase in the rate of flow. A vertical section reveals this is true and shows that they have no central tube. I have seen excellent examples of this in Goochland Cave in Rockcastle County, Kentucky.

FLOWSTONE

Flowstone can be seen covering walls, floors and other formations in 70% of the caves in this re9ion. Flowstone is formed by $CaCO_3$ enriched water flowing over any part of the cave and depositing cyrstals that are, according to Sweeting (1973, pp.186) oriented perpenduicular to the surface of deposition. This usually causes a smooth surface. When water meets an obstruction the CO_2 is lost and deposition takes place. These deposits are usually referred to as "Travertine."

If water flowing along a cave floor meets an obstruction CO_2 is released and deposition occurs. As this continues the depositional build-up will form a dam-like structure. This structure is known as a "Rimstone Dam."

Calcite will continue to be deposited at the lip of the dam where the water losses its CO_2. In Sloans Valley Cave, Pulaski County, Kentucky, I have seen these dams vary from $^1/_{10}$ of an inch to 4-feet in height.

COLUMNS iStalacto-Stalagmite)

Columns can be seen in 65% of the caves in this region. They often take on the appearance of huge pillars holding up the cave roof. The columns have two ways of forming. The first occurs when a rapidly growing stalagmite meets an overhanging stalactite. The second is just the reverse, that is, a stalactite grows rapidly downward to meet a stalagmite. After one of the two occurs, water carrying $CaCO_3$ flows down the exterior and deposits a layer of flowstone. Continuation of this gradually enlarges the formation. I have seen examples of this in Sloans Valley Cave, Pulaski County, Kentucky.

DRAPERIES

Draperies can be found in 45% of the caves in this region. Draperies appear as their name implies, Stone-like Draperies. These form by $CaCO_3$ saturated droplets flowing down inclined surfaces. As the water meets an obstruction CO_2 is released and deposition takes place. As each additional drop follows the same path a thin sheet of $CaCO_3$ is formed. If this sheet is extremely thin with colored bands, due to impurities (usually iron and manganese) it is then termed "Bacon Rind." I have observed spectacular examples of this in Big W

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Cave in Jackson County, and Broken Cave in Rockcastle County, Kentuciy.

CAVE SHEILDS (Palettes)

15% of the caves in the area show some form of the sheild deposit. The sheild formation known as an "Helectite" is thought to be formed by seeping water. According to Sweeting (1973, pp.188) the seeping water forms semi-circular sheets of calcite. They are almost always associated with joints or fractures. Each sheild consists of two parallel plates separated by a fracture, which is an extension of a joint in the rock wall. It is thought that water seeps under pressure along this fracture to the rim of the sheild. Here deposition occurs.

HELECTITES (Anthodite)

Within 15% of the region's caves, small twisted structures can be seen growing from the walls, floors, ceilings and other formations. These are "Helectites." These bent stalactites are thought to result from water seeping through minute central tubes that cause calcite to crystalize in an irregualr position. It is known that there is a change in crystal axis in the orientation of the formation. Sweeting (1973, pp.187-188) concludes that they are a seepage deposit and the seeping water under hydrostatic pressure issues from a minute opening. Past theorists thought that the irregular pattern was due to a change in rate of water flow or change in air currents.

As of the present there is no confirmed theory. I have observed beautiful examples of clustered helectites in Big W Cave in Jackson County, Kentucky.

CAVE PEARLS

Cave Pearls occur in 10% of the caves in this region. Cave pearls are pearls in the true sense of the word. They form just as the marine type do, around sand grains and other foreign matter. Here agitation from dripping water into a saturated pool of $CaCO_3$ releases CO_2 and deposits a concentric layer of calcite around the particle. More layers are deposited and the pearl enlarges. These somewhat spherical formations are often cemented by calcite to the bottom of the pool. I have observed these in Broken and Pebble Caves in Rockcastle County and in Big W Cave in Jackson County, Kentucky.

GYPSUM FLOWERS

Gypsum Flowers are somewhat of a rarity in this region. They can only be seen in 5% of the area's caves, and are usually found in the dryer passages. This formation is formed by seeping water with deposition occurring at the base of the formation. Here the $CaS,O_4{\cdot}2H_2O$ is deposited and the older srystals are pushed outward. I have seen excellent examples of gypsum flowers in the dry passages of Sloans Valley Cave, Pulaski County, Kentucky.

CONCLUSION

At least 80% of the caves in the Jackson, Rockcastle and Pulaski County region contain calcareous cave deposits. The absence of the deposits in the remaining 20% can be contributed to active passages. This is to say that the passages are easily flooded and often are the main paths for ground water. This constant flow would destroy or dissolve any deposition that had taken place. Other caves simply may have formed too deep for deposition to occur. The best results for cave depositsion to form is when cave formation is near the surface and not beneath a caprock (Sandstone.)

Of the 80% of caves that do contain formations, one finds that they form in four environments. (1) Dripping Water —An example of this are the stalactites and stalagmites. (2)Running Water—Flowstone can be contributed to this. (3)Seepage Water—Gypsum Flowers form in this environment. (4) Submerged—The Cave Pearl is a fine example of this.

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You Are What You Eat— Even When Caving

Everyone needs certain recommended daily requirements of nutrients such as carbohydrates, fats, proteins, vitamins and minerals everyday. However, cavers must take into consideration additional needs if they want to stay efficient, alert and balanced nutritionally.

A caver's first need is calories, believe it or not. Cavers will burn many more calories than normal because of the strenuous muscular activity plus the energy needed to maintain body temperature. A drop in body temperature can lead to a serious life-threatening situation. Candy is a concentrated source of calories because of its high sugar content, but must have available the B vitamins to convert it to energy. Therefore it would be of great benefit to the caver to take a vitamin tablet with breakfast. Even a supply of vitamin capsules could be taken along to be consumed throughout each day. Other vitamins are also needed. People who go caving each week end after working all week, rather than exercise in the fresh air, must have Vitamin D to prevent bone softening since there is no sunshine available. Vitamin A is also important because of its relation to the eyes ability to adjust in dim light.

Next in importance is a good breakfast. If the traditional doughnuts and coffee are all that is eaten before going in the cave, you will soon find your energy lagging, your stomach gnawing from hunger, and your performance "nurdie." Authorities tell us at least one fourth of the days nutritional requirements plus a good source of protein should be consumed at breakfast. Milk or eggs are excellent sources of protein. Sausage or bacon, although considered primarily fat foods, and whole grain cereals (not refined) are fair sources of protein. The calorie needs of each person depends mostly on body size, age, and muscular activity. Cavers would be very active and require at least a minumum of 3200 calories. An example of a good breakfast with a source of protein and at least 800 calories would be:

2 eggs (fried or scrambled)	200 calories
3 strips of bacon	150 calories
1½ glasses of milk	240 calories
2 pieces of toast (2 pats butter)	210 calories

Cereal could be added to the breakfast for extra nutrition.

Everyone's daily diet should include the basic 4 food groups which are:

1. Milk and Milk Products. These could be obtained in a cave from powdered instant milk or cheese. The powdered milk would require a source of fresh water. Cheese away from refrigeration might mold easily. The mold should be cut away, then the remaining cheese would be suitable for eating.

2. Fruits and Vegetables. Fresh fruits (other than apples) would be easily crushed, or mashed, heavy to carry and very perishable. However, dried fruits, such as raisins, apricots or apples are light in weight, high in nutrition and energy, and do not easily spoil. Fresh carrot and celery sticks are good roughage, and would provide vitamin and minerals, and act as a detergent food to clean between teeth. Particularly if a lot of candy or sweet sticky foods are eaten. Detergent foods help in preventing tooth decay when brushing is not practical.

3. Meat and Meat Substitutes. Sandwiches could be taken with meat, egg, or cheese but must be eaten within 24 hours since the filling would spoil and the bread becomes soggy or moldy. Nuts (a meat substitute) are very good caving snacks to eat anytime since they are high in energy, a source of protein and do not spoil readily. If the trip is overnight, dried eggs could be scrambled for breakfast.

4. Cereals and Bread. These can be obtained at breakfast or in sandwiches.

Food must be carried by the caver as he or she goes through the cave. Therefore it should be light in weight, nutritious, easily prepared with little or no cooking required, not perishable or easily crushed as well as tasty. Since canned foods are bulky and heavy they should be replaced with freeze-dried foods if water is available. Some freeze-dried foods require heating and this should be considered when selecting food for the trip. Instant tea or coffee, or instant powdered soft drink mixes, such as Kool Aid or Tang could be taken along for reconstituting within the cave. These powdered beverages would contribute little nutrition other than calories or a little Vitamin C, if it had been added to the soft drink mix.

Very careful planning of meals is essential if the cave trip is to last for more than a day. Even a days trip should be planned with an extra food source in case of an emergency, such as high water, or a cave in.

So you see it is just as important for a caver to have the right food along as it is to have the right equipment. You life could depend on it someday. Just ask any experienced caver. They know good nutrition can make the difference.

This article by: Ruth R. Sellers, Nutrition Instructor, William Booth Hospital, School of Practical Nurse Education.

Caver's Quotes

That was a B.A.T., H.T.T., P.O.T., H.A.T. and that's no P.O.C.!

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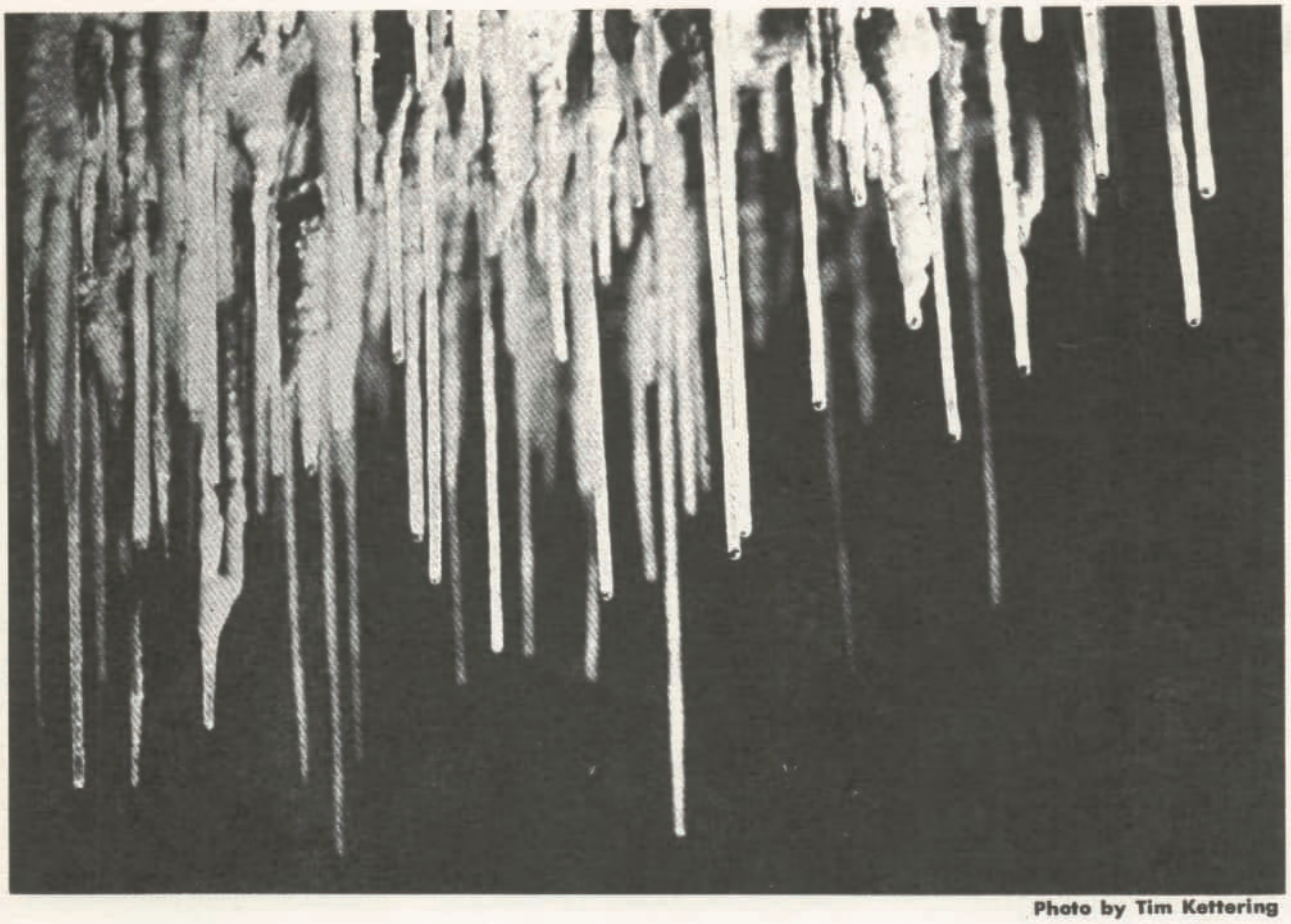


Photo by Tim Kettering

SODA STRAW FOREST

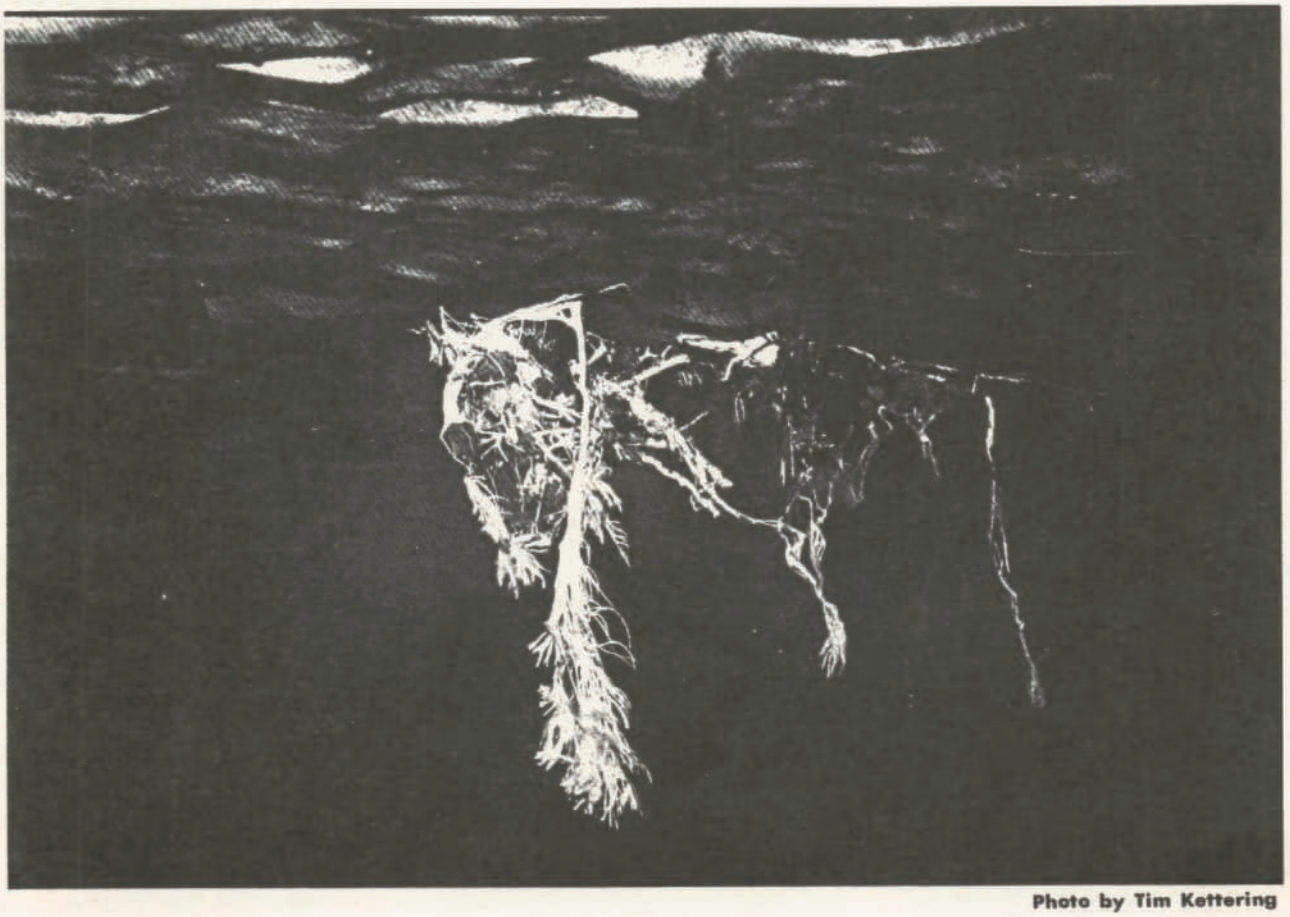


Photo by Tim Kettering

"FEATHERY" FUNGUS GROWS DOWNWARD

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Boy, Do I Need Help in Geology

By Marvin Knasel

How many times have you been at the entrance to a cave looking at the different fossils encrusted in the rocks? You look at one of your buddies and say, "Now that's a Neat Rock!" He, being more learned replies, "That's a Paleo Bioherm of Litho Strotionella Tetracoral!" Naturally you turn to another buddy and say, "What the hell did he say?" His answer, "I think he said it was a Neat Rock." I've gotten the same feeling typing several of the articles for this publication, so I decided it was time I tried to understand some of the terminology.

The following is a list of definitions I looked up so I could at least partially understand what I was typing. This endeavor is dedicated to anyone, who like me, needs all the help they can get to understand geology. One other note at this point before I delve into definitions, is these are entirely my interpretations of the words listed, which I believe to be correct, if I am wrong about any of these words I eagerly await the correct definition.

Paleo Bioherm— Ancient fossil of a genus of sea slug or gastropod.

Tetracoral— A division of corals, corresponding to the Rugosa.

Rugosa— An order or other group of sclerodermatous corals, exhibiting tetramerous (4) arrangements of parts and a well developed corallum with true thecae and generally septa and tabulae; the Rugose Corals.

Sclerodermatous— Hard outer covering.

Tetramerous— Consisting or divided into four parts.

Corallum— Coral; the skeleton of a coral polypidom; the calcified tissue of the coralligenous actinozoans.

Polypidom— The dermal system (outer covering) of a colony of individual actinozoans, hydrozoans, or polyzoans.

Actinozoans, Hydrozoans, Polyzoans— Classes of molluscoid invertebrated animals, sea mosses, or sea mats.

Septa— A wall separating two cavities.

Tabulae— A hard, flat, expansive surface, as of bone; specifically in corals.

Thecae— The cup formed of calcareous substance, about the base and sides of an actinozoan.

Bryozoan— A name formerly given to the Polyzoan, from their resemblance to mosses.

Brachiopods— A class of mollusk-like animal distinguished by the development of two labial (generally called brachial) appendages, diverging from either side of the mouth.

Pelecypods— Bivalve mollusks, so named as a class from the shape of the foot in some forms (hatchet-shaped).

Blastoid— Having the characteristics of the Blastoidea which are a group of fossil pelmatozoan echinoderms without arms, with ambulasra fringed on each side by pointed appendages in close relation with side plates, which rest on or against a subambulacral lancet-plate pierced by a canal which lodges a water-vessel, and with hydrospires arranged in 10 or 8 groups limited to the radial and interradial plates.

Crinoid— An encrinite; a stone-lily, sea-lily, lily-star, feather-star or hair-star. The crinoids contain those forms which, during the whole or early part of their existance, are fixed by a jointed, flexible stalk or are attached by the lower surface of the body, so named for their resemblance to a lily.

Gastropods— A gastropodous mollusk. A group of mollusks to which different values and limits have been assigned.

Paleozoic— Applied to the earliest period of historical geology and the oldest division of sedimentary rocks, beginning with the lowest stratified fossiliferous group, and extending upward to the base of the Triassic, or to the top of the Permian. The grand divisions of the Paleozoic are, proceeding upward or to groups later in age; the Cambrian, Silurian, Devonian, Carboniferous and Permian.

Cambrian— A term generally applied to all rocks bearing a fauna more ancient than the Silurian. In America it is generally subdivided into the Lower or Georgian, Middle or Acadian, and Upper or Saratogian divisions.

Silurian— A name given by Murchison in 1835 to a series of rocks the order of succession of which was first worked out by hime in that part of England and Wales which was formerly inhabited by the Silures. Also known as the "Age of Mollusks."

Devonian— Term applied specifically by Sedgwick and Murchison to a great part of the Paleozoic strata of North and South Devon, and used by them as synonymous with "Old Red Sandstone." Also known as the "Age of Fishes."

Carboniferous— Containing or yielding carbon or coal. The Carboniferous is separable into three more or less distinct groups: the coal measures, the millstone grit and the mountain limestone. Also known as the "Age of Coal or of Land Plants."

Permian— The rocks of which the Permian system is composed are largely red sandstone. The Permian is of great economical importance in Europe, as the repository of extensive deposits of rock-salt, gypsum and other Saline combinations.

Limestone— Rock consisting wholly or in large part of calcareous material or carbonate of lime.

Atlatl— Throwing stick of the Mexicans used for propelling spears with great force. The word Atlatl is used for the weighted stone used on these sticks by the Indians. (See Banner Stones)

Banner Stones— Certain stone objects shaped like a small two-edged ax, which are supposed to have been worn as ornaments in pre-historic times, or held in the hand as badges of authority. They have an eye for insertion of a handle.

Cenozoic— Containing recent forms of life: applied to the latest of the three divisions into which strata have been arranged with reference to the age of the fossils they include.

Epoch— One of the shorter divisions of geological time.

Pleistocene— The glacial period of North America.

Hiatus— A gap. A space from which something requisite to completeness is absent, as an interval of unknown history.

Mega— A prefix to a unit of measurement to denote the unit taken a million times.

Archimedes Bryozoan— A genus of extinct cryptostomatous bryozoans having a broadly spiral zoarium coiled about a solid vertical axis. It is very abundant in the lower Carboniferous limestones. (Screw-shaped)

Archaic— That portion of North America consisting of the most ancient rocks about which as an axis the later sediments were deposited.

Coprolites— Any rounded concretionary mass or pebble containing largely calcium phosphate and representing the more or less altered debris of fossil bones, teeth, etc.

Steatite— An inmpure massive variety of talc.

SWORCA Meets the First Thursday of the Month, Why Not Join Us for a First Rate Meeting and Slide Show.

Four-Wheel Drive Report

By Richard Sellers



Don't Bring a Sports Car to Rockcastle County!

If you plan to do any serious caving in Rockcastle County you'll quickly find that this is not exactly a resort community. We country boy cavers of Rockcastle are unaware of the urban environment enjoyed by the city-type cavers of Pulaski County. The main roads are wide enough to pass, but that's as far as it goes. Step off of any paved road and if you don't have a truck or preferably four-wheel drive you may be in for some new mufflers, tailpipes, flywheels, control arms, wheen alignments and body work or else you might get stuck entirely. We country boy cavers have learned the necessity of bringing tools to dig out jeeps and how helpful a good winch can be if you can afford one. Still we manage to get our vehicle stuck in mud, stalled out in high water, bottomed out and scraped on boulders in the road and just plain torn up in general on overhanging branches and bushes, barbed wire, etc. There's no end to the ruggedness. Perhaps Tim Kettering has the right idea buying the oldest truck he could find and not shedding a tear when it gets scratched up, or so I thought until that old Chevy wouldn't start when we needed it most after an all night B.A.T. In any case keeping all luxury type (low road clearance) cars at the hut and leaving the rough stuff to the big boys pays off. Nurds beware, or you'll be singin these blues too!

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Connection—Reality At Last

By Marv Knasel

This Saturday morning started out the same as any other caving Saturday. Pete Miller picked me up at my house about 5:00 a.m. and we drove to Rockcastle County. Pete and I met Werner Jud outside of Goochland Cave about 9:30 a.m. We did not know it at the time, but we would not be coming back out the same entrance.

We proceeded to the second breakdown where our exploration was to begin in earnest. We decided not to sign the register on the other side of the breakdown until we were heading out. (Ha-Ha-Ha). We went to the subway and on to the big room with the flowstone formation. Upon reaching this room we entered the stream passage and followed it upstream for about 150 feet. After coming to a crack in the ceiling, we found we were at the point Pete wanted to explore to begin with.

We sat there eyeing the mud crawl ahead of us. At this point I was having second thoughts about all the fun we were having. The crawlway averages 15 to 25 feet wide and from 9 to 18 inches high. But this proved to be the "Breakthrough" we have been looking for.

After about 400 to 500 feet of miserable mud crawling you enter what we have named the "Relief Room". This is very well named. About 10 feet to the left in this room is another passage that takes you to a pit area. We entered this area and gave it a going over like you would not believe. Pete and Werner checked out a high passage to the right, while I was checking the lower passage. They both proved to be too tight. After more checking, Pete decided to check out a passage that Werner and I saw that was high on the opposite wall.

At this point there is a flowstone formation about 3 feet by 9 feet about six feet from the floor of the pit. There is canyon passage beyond this point. This passage leads you to Helictite Heights. We proceeded further into this passage hoping to find another way besides the mud crawl to get back. Our endurance was straining at this point. Pete noticed footprints lower in the passage. For a minute we thought we were back in Buddha Passage. Reality finally caught up with us when Werner recognized this as being Poplar Pit Cave.

After much yelling, handshaking and laughing we got down to business and found the passage that took us to the pit in Poplar that would take us to the outside world.

It was promply decided that this was now the Poplar Pit Entrance to Goochland. We had also decided that Pete was to try and chimney the 60-pit and return to the car and get the climbing gear.

After reaching the pit area Pete and Werner were able to climb out. My strength was gone and I had to wait in the "Freezer Section" of this cave for an hour and 45 minutes, until Pete returned. I must admit my spirits were lifted immediately upon his return. I had thoughts of becoming a permanent fixture in the bottom of the pit.

The rope was dropped to me along with my climbing gear and the rest was a P.O.C. I finally got to the top and was taking off my gear when it was pointed out to me the way the rope was rigged. They had rigged it rock-climbing style with an aluminum jam. I was a little speachless at this point. I hasten to add that the rope was fastened very securely and away from any sharp rocks.

My advise to anyone wanting to make this connection is simple, a good breakfast, knee and elbow pads, some water and some candy. It would be very helpful to have a rope rigged at Poplar Pit. Remember we had no choice. A fall at this point in the cave would be fatal. SWORCA has worked hard at this connection with no serious accidents or injuries and I vote we keep it that away.

I wish to express my sincere thanks to the other members of SWORCA who have worked hard to make our success possible. Without many previous trips into these two cave systems a connection would not have been possible.

To say this was an exciting trip would be at the very least an understatement. This has got to have the top spot in my caving adventures. A connection between two cave systems of this size is not an everyday occurance. Again, many thanks to the other members of our club who made this trip so highly successful.

Special Report: Cave Fever

By Tim Kettering

Victim complains of lack of damp air, darkness and will have a blank expression; does not readily respond to questions, and has little will to do work of any kind.

The cave fever sufferer will frequently disappear, only to be found in the basement or garage desperately searching into boxes looking for caving gear. He mainly feels an undeniable need to be surrounded by caving books. As the disease progresses the patient may not be able to cope with a powerful urge to leave home and travel into the deep recesses of caving country.

He or she will make unexplainable phone calls to total strangers about a secret cave, hidden away in the hills. In the final stages of the disease the patient will be reduced to a mere shell, as he or she sits fully clothed in coveralls and caving gear. Occasionally the victim can be heard mumbling to himself. Sleep will be impossible as it is pierced with violent dreams of deep pits and big echoing passages.

CAUSE—When a gung-ho caver is restricted from caving.

TREATMENT—Conventional medication is useless. Frequent caving trips will bring about temporary, but not complete recovery. Total recovery can only be achieved through a prolonged caving trip of many weeks enjoyed with a number of friends. Caving fever is never fatal. The victim may however appear to be lifeless, if not treated properly. The disease will strip him or her of all natural responses and reflexes, except a slight twitching of the mere mention of a cave or a caving trip.

Entrance Signs—A SWORCA Conservation Project

The condition of this cave is a reflection of how previous visitors have followed these rules of CAVING COURTESY. PLEASE!

TAKE NOTHING
BREAK NOTHING

MARK NOTHING
LEAVE NO TRASH

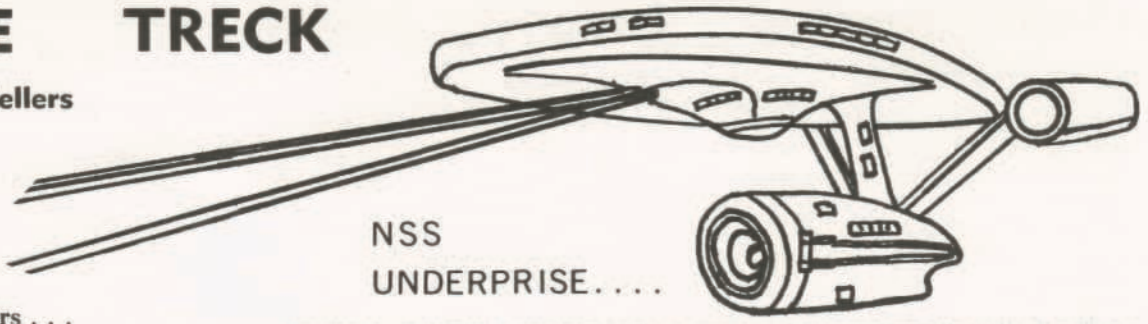
By Richard Sellers

A few years ago Matt Cholmondeley came up to me with these plastic signs and asked SWORCA'S help to distribute them around various heavily traveled cave entrances in our area. I agree with Matt that they serve as informers to those who aren't aware of caving courtesy and reminders to those who are. Our thanks to Matt for his efforts to print these signs.

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CAVE TRECK

by Rick Sellers



Featuring:
Captain Quirk
Speleok
Scotty
Lt. O'Hara
Dr. McCoy
and a host of others . . .

CAVES—The final frontier. These are the voyages of the starship Underprize. Its two-day mission: To explore strange new caves, to seek out new life, to boldly crawl where no nurd has crawled before!

and now, CAVE TRECK ...

Captain Quirk: Scotty, give me a status report.

Scotty: Aye, captain. Anti-matter pods functioning perfectly. We've got a full tank of lithium crystals and you know how hard that is these days.

Captain Q.: You're not kidding there. Speleok, give me your opinion.

Speleok: It appears logical captain that we plot a course for the Rockcastle Asteroid Belt. Sensors indicate numerous caves of high Dolomite content there in star quadrant Johnetta at the following co-ordinates ...

Captain Q.: Never mind Speleok, just plot the course!

Captain Q.: Transporter Room, beam aboard all gung-ho cavers.

Transporter Room: All cavers abaoard, captain.

Captain Q.: Excellent! All ahead warp factor 55. We don't want to be picked up by any stray radar units from the Federation.

COMMERCIAL

NOW! Get into the exciting and rewarding career of cavern and Karst area management. Enjoy the underground, protect cave life, arerest violators. And for a limited time only, you get this free "CAVE LO-CATE-O". Helps you find the big ones ... FAST! Just hold this three-pronged cave divining rod in oy your hands and it PULLS you right to the nearest cave. You can't afford to be without one! And for the first five billion customers, this free rip-o-graphic topo map—with all the cave locations in the wrong places. It's for all those nurds who wanted you to take them caving, but were afraid to ask! Contact: The ACNE School of Karstlands Management.

Do it today!

Back to Cave Treck

Lt. O'Hara: I'm picking up some stray signals from some of the local inhabitants of the asteroid caving belt, captain.

Captain Q.: Good. Lock on to those co-ordinates and prepare to beam down a landing party. Speleok, if I asked you where the best caves were, what would you say?

Speleok: Difficult, captain. That phenomenon ls a function of a multiplicity of parameters, each of which may be determined only in the light of its particular geologic and environmental sub-entities, the vast majority of which remain specifically undetermined at this time.

Dr. McCoy: Dad burnit Speleok! I get sick of your Vulcan double talk! Can't you put that in plain, simple English?

Captain Q.: I believe what Mr. Speleok is trying to say is that he just doesn't know.

Speleok: Correct, but quite crudely expressed, Captain.

Captain Q.: Let's get down to the transporter room.

(Party enters transporter chambers and Quirk gives command to energize. Cavers land only to find the unfriendly local inhabitants pointing a double barreled phasor gun down their backs.)

Local Inhabitant: You fellers state your business. What the heck are you doing on my property?

Captain Q.: We come to you in peace. We're only a group of Federation members trying to go in the cave on your property. I submit that we mean you no harm.

Speleok: Tricorder readings show guano levels at a maximum here, Captain. There appears to be a cave having a gaseous vasicular entrance with obsidian walls. This must be the place.

Local Inhabitant: Well, if that's all you wanted, I quess it's OK by me. Be careful, though. We've had an inch and a half of meteor showers and that cave's been known to flood.

Captain Q.: Don't worry. We're experienced and we're all Federation members, we know what we're doing.

(Quirk steps back and trips on a tree root.)

Dr. McCoy: Incidentally, what is the name of this cave?

Local Inhabitant: Tribble Cave.

(Cavers proceed into entrance and Speleok looks down to discover in the dust the corroded remains of a strange metal object.)

Speleok: Look captain. If I'm not mistaken, this ancient artifact was once used by primitive cave explorers of the late twentieth century, long before the discovery of antigravity descending techniques. I believe it was referred to as a rappel rack. Just look at it lying by that pile of spent lithium. Must be those durn Klingons, they're always dumping spent lithium crystals in caves!

Captain Q.: This is our lucky day. Save it for the museum.

(Cavers enter a very long crawlway.)

Dr. McCoy: We've been crawling for hours and all the signs of life I've seen are these durn tribbles on the walls. The ceiling is getting lower and my knees hurt! This cave is really difficult!

Captain Q.: Shame on you Bones! Don't you know that a cave never is difficult for an experienced caver. You just keep on crawling until your helmet hits solid rock, then it's not difficult, it's IMPOSSIBLE! Now, I don't want to hear any more out of you.

Speleok: Look captain, in this rimstone pool, a very rare blind tribble, Subterraneous Tribbulous! Fantastic! In all my caving career I've never seen one of these.

Captain Q.: Speleok, I've never known you to get excited like that before. Calm down.

Dr. McCoy: You half-breed, that's your human side showing through.

Captain Q.: I think we have had a very fruitful trip. As you know we never give up, we just run out of time and I've got to be to work early tomorrow morning, earth time. Let's head out.

Speleok: Captain, red alert, tricorder indicates heavy precipitation and subsequently some very rapid flash flooding.

(Water level begins to rise.)

Dr. McCoy: We're trapped!

Captain Q.: Don't worry, I know what we can do. Point your phasors toward the ceiling, put the control on maximum. At the count of three, give it all you've got. One, two, three ... (Cavers fire simultaneously.)

Captain Q.: There you see, when the rock cools down we just chimney straight up. A bit destructive to the cave, but ...

Speleok: But what, captain?

Captain Q.: It gives our story a happy ending. (Quirk gives Speleok a kind of half-smile.)

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SPORT CAVING

By Mary Gratsch

The thrilling game of "Caver against Caver". The object is to receive the least number of points yourself while adding points to the scores of other cavers.

This unique game can be used as a method of rating your fellow companions to see how or whether they measure up to your standards.

RATING SYSTEM

0-25	**Super Caver**
25-100	**Caver**
100-200	**Spelunker**
200-300	**Neophyte**
300-400	**Nurd**
400-500	**Sub-Nurd**
over 500	**Expell from Caving**

DIRECTIONS: I will make up a situation to demonstrate how the game is played.

Let's assume R.S. has fallen behind. The group has to wait for him to catch up. When he finally does, he explains that he had to build a bridge over the stream so he wouldn't get his feet wet. Then he reminds us that the cave radio is pretty heavy to carry by oneself.

For this little episode whe would be given 180 pioints; 35 for falling behind, 40 for holding up the group, 20 for nurd-like behavior (building a bridge), 30 for deliberately avoiding water, 10 for admitting to it, 25 for complaining about carrying the radio, and 20 for 2 nurdy excuses (10 each).

You must keep adding on the points until you arrive back home. They are then totaled up and a rating is given. Remember—points can be given to the same person for the same item as many times as he/she is caught.

Tripping, Falling, Slipping	10
Using Nurdy excuses	10
Admitting to something	10
Complimenting another caver	10
Person who comes out of cave with cleanest coveralls	10
Saying "We'll catch it on the way out" or "We'll check it out next time."	20
Losing something	10
Losing something while in the cave	20
Not finding it within 5 minutes	30
Making a mistake	20
Nurdlike behavior	20
Last one out of sleeping bag	20
Wearing nurd (knee) pads	20
Admitting you can't take it	20
Showing hesitance	20
Person who comes out the driest	20
Putting on clean coveralls when you have a dirty, wet pair you could wear	20
Last person to suit up	20
Last one to enter cave, first to emerge	20
Falling asleep in car	20
Driver falling asleep	300
Using air mattress, padding or pillow	20
Forgetting something	30
Deliberately avoiding water	30
Not being eager to push a crawl or water passage	30
Getting stuck	30
Not stopping to check out a sink or other likely opening	30
Giving up on a passage or chimney when it could be dug out	30
Falling behind	35
Getting lost (to or from cave)	35
Getting lost in cave (has to be rescued)	300
Being temporarily confused	35
Holding up the group	40
Showing up late for departing time of cave trip	40
First one desirous of or mentioning leaving the cave	50
Light troubles	50
Wearing a wet suit	60
Spending the night in a motel while on a gung-ho trip	150
Entering cave without 3 sources of light (of your own)	300
Raunching up cave/owner relations	500
Dumping spent carbide in a cave or field	500+
Breaking off a formation	500 (Each)

Play "Sport Caving" on your next trip and see how much fun it can be!!!

REMINDER: To a caver . . . nothing is difficult unless it is impossible.

(P.S. The inventors of this game are exempt from being rated themselves, but may rate others.)

Caver Test

Are you a caver or a normal person?

Are you sure?

Take the notorious SWORCA Caver Test and find out.

(Miss one and you're not a caver.)

Answer Yes or No

1. Do you enjoy dark places?

2. Do you find yourself enjoying low, muddy, wet crawls?

3. Do you get a tingle up your spine when someone mentions "caving?"

4. Have you had your annual "Histo" check-up?

5. Do you start to drool when someone says "This is the big stuff?"

Multiple Choice

Do you nurd out when the virgin passage turns into: (A)a bathtub (B)a low chert crawl (C)a bottomless pit (D)all of the above (E)other

When someone mentions "breakdown" do you first think of: (A) nervous disorder (B)vehicle malfunction (C) A & B above (D) cave rock pile

On the last cave trip, you were in: (A)neck-deep mud (B)water up to your eyeballs (C)a 100-ft. chimney (D)a 7-ft. traverse (E)a 4-in. crawlway (F)all of the above

If you find a string in a cave, do you first think of: (A)your coveralls are unravelling (B)"We're saved!—Follow it!! (C)nurd pollution

Equipment Test
Answer True or False

a) Jumar Jam is good with rye bread and peanut butter.

b) Gell Cell on toast is a tasty treat.

c) Goldline is $180.00 an ounce.

d) When descending a pit one must first be put on the rack!

e) "Minespot" refers to sleeping arrangements for each person, ie, that's minespot, get out!

f) Nickle Cadmium is 5¢ worth of cadium.

g) Bluewater is found in a clean lake on a clear day.

h) In order to trace a stream flow, some cavers may die.

i) You are rappelling without Right Guard.

Answers: Yes, Yes, Yes, Yes, Yes, E, D, F, C, False, False, False, False, False, False, False, False.

SWORCA Meets the First Thursday of the Month, Why Not Join Us for a First Rate Meeting and Slide Show.

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Rockcastle County Memories

By Mary Gratsch

Keeps calling me . . . calling me home.

Caverns sinking in my soul, deeper than the ones I've done. Gooey mud that clings to me and my Rockcastle County Memories.

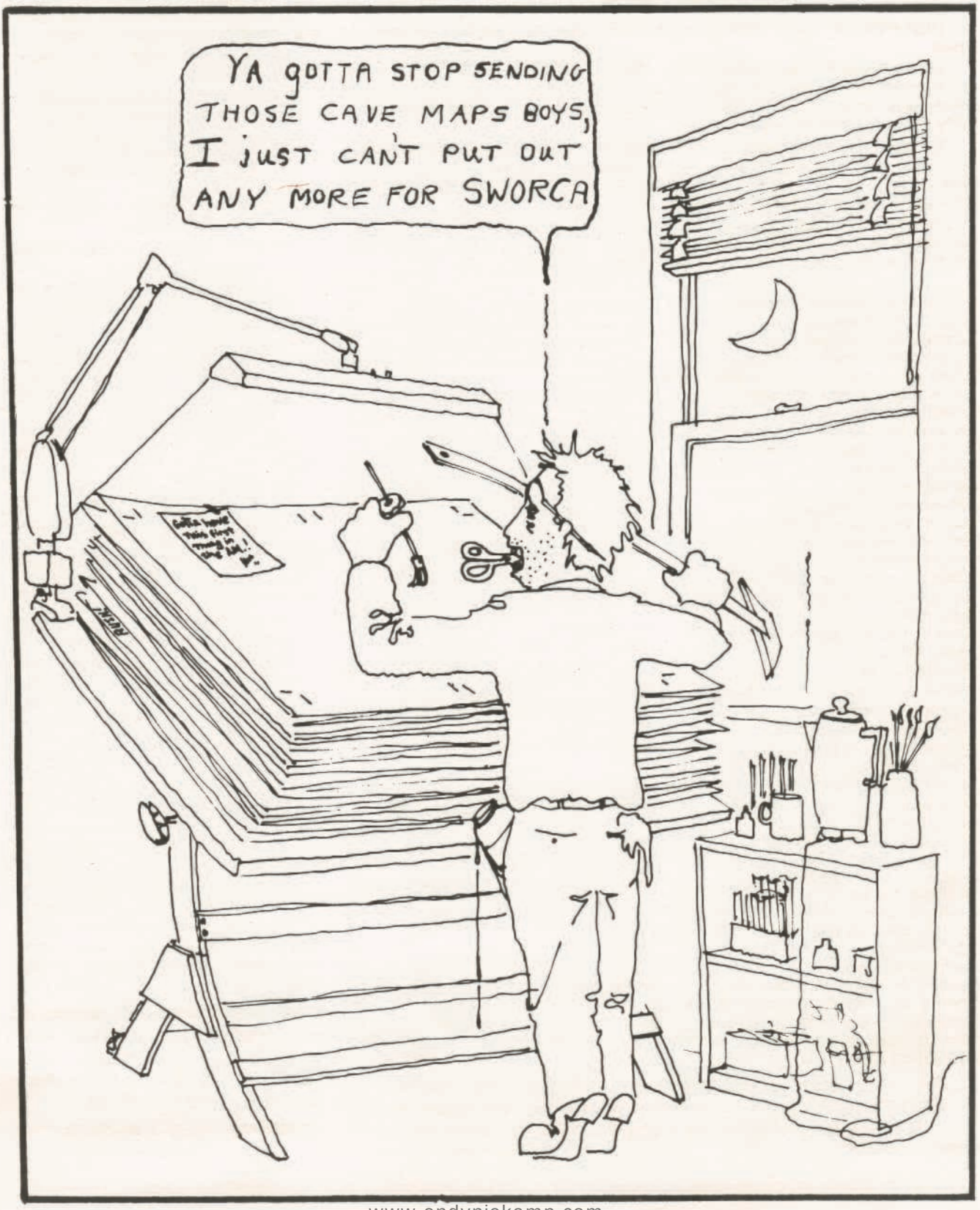
A clean, dry caver with a bat on his hardhat, works to plot out his last cave map. He squints with his eyes and the lines on his face tell me as much as the maps he's made.

Talking about my Rockcastle County Memories, lurid caves of Kentucky. I was so sad to leave, leave my muddy homes. Think about them in my dreams, a long passage with many leads, from a hidden entrance blows a breeze. Oh, my Rockcastle County Memories!

Caver plot your survey please, plot the caverns miseries. I've been down those water crawls, sketching in the walls.

No maps left for me to do, we've surveyed the connections, so now I'm through. Now there's nothing left for me but my Rockcastle County Memories.

Rockcastle County Memories about my home in Kentucky. Damp, dark caves keep calling me . . . calling me home.



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Beyond The Second Breakdown

By Mary Gratsch

Tim Kettering, Dave Sligar, Davy Harris and I reached Climax Church parking lot at 10:30 Saturday night, February 3, 1974. Rick Sellers and John Evans were already at the cave. We packed our sleeping bags, Coleman stove and lantern, blankets, plastic and food for the hike to the small entrance of Climax Cave. After setting up camp at the usual spot, we sat around the Coleman lantern eating Jiffy Pop popcorn and catching up on the latest news.

At 5 a.m. the alarm buzzed, but Tim quickly turned it off and fell back to sleep. It was 7 a.m. before everyone finally got up. Breakfast consisted of hot chocolate, candy bars and peanut butter and jelly sandwiches. We emerged from the cave to find everything covered with two to three inches of snow. After a brief snowball fight, we got into the cars and set out for Goochland Cave.

Trouble came when Tim's car stalled out in Crooked Creek near Goochland. (See footnote #1) Surveying the situation, we found the stream's water level was two to three inches above the bottom of the door and the entire exhaust system was under water. There was nothing else to do but don our caving boots, get in the icy stream and push the car to higher ground so it could dry out. Tim got the Chevy running again by siphoning gas from his tank and pouring it into the carburator. This took about an hour.

We parked at Goochland's parking area. As it turned out everyone had different plans on how to spend the day. Tim and I wanted to try one last push at the second breakdown pile. Dave was going to dig for indian artifacts at the entrance, Davy planned on exploring the cave on the opposite hill (Crooked Creek Cave) and Rick and John had brought the cave radio along so they could use it. John, Davy and Rick accompanied Tim and I to the first low spot in the first breakdown to see if the water was low enough to get through. There was ample air space, so Tim and I trudged on into the water, while the others returned to the outside. Less than thirty feet from map point 89, near the 35-foot dome,we set the radio up so it would transmit.

When we were sure the radio was working O.K., we set off to find our way through the breakdown. The hole we had picked to push was one found on an earlier trip with Werner Jud. (See footnote #2) We wriggled, squirmed, squeezed and fought our way into any space just barely large enough to get through. And if it wasn't, we moved rocks and boulders to make it large enough! One and a half hours later we emerged into a little room, from here on the cave really opened up. We had penetrated the "Second Breakdown."

Tim and I were completely awestricken as we wondered through the virgin passageways and chambers. The whole character of Goochland had changed. (See footnote #3) We were in a maze of levels, domes and good-sized rooms. Taking only the largest, most probable passages, we literally ran to see as much as we could in the short time we had. We covered what is today named the Register Room, Subway Station, The Subway and the Christmas Tree Room.

After the initial shock at the size of the Christmas Tree Room wore off, we decided we had to turn around and go back to the radio. Though we a left piles of rocks at various intervals, we were so excited we forgot to mark some key intersections. As a result, we got turned around quite a few times. It took us 45 minutes to go from the Relief Room to the place where the crawl started. Once clear of the breakdown pile, we packed up the cave radio and trucked for the entrance. Davy, John and Rick met us near the first breakdown and carried the radio gear the rest of the way to the cars. The trip for Tim and I had been a total of six and a half hours, but well worth what we had seen.

John and Rick had been successful in finding the radio point. They got a depth reading of 100 feet. Since the ceiling height where the radio was placed is only 35 feet, this meant there was more than 70 feet of rock and dirt to the surface. The cave radio also showed that the cave very closely follows the contours of the valley floor.

We stopped at the Country Kitchen in Berea on our way home for supper. Over a hot meal, we discussed plans for exploring and surveying the new section. We knew we could count on Pete Miller, Marv Knasel and Werner Jud to help with the large task we had before us. (They didn't let us down for one minute!)

This time we realized we had hit it "Big!!"

1. There is a fork in the Goochland Road a short way before the cave entrance where you can either choose between a delapidated wooden bridge or a short drive in the creek.
2. Tim, Werner and I explored this spot a couple of weeks before but found it blocked by a boulder. Werner and Matt returned a week later and with the aid of a tire tool, Werner was able to open the passage, but did not have the time to push it further.
3. See article entitled "The Beginning, With No End In Sight."

SWORCA Contacts "Elusive" Goochland Owner



Goochland Owners—Albert and Mrs. Schweitzer and daughter at their home in West Milton, Ohio.

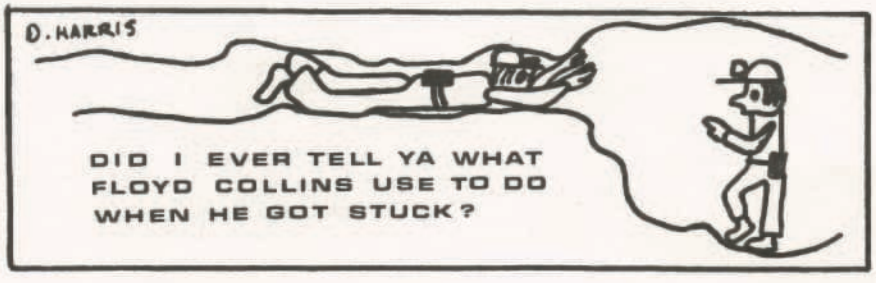
By Richard Sellers

In 1967 I first visited Goochland Cave in Rockcastle County, Kentucky. Since that time and especially in the last 3 years, I have made scores of trips and donated a great portion of my life to Goochland. With Smokehole Cave nearly closed, it began to grow in my curiosity about the owner of Goochland and his future intentions for cavers.

By accident I came across Mose Anglin in Rockcastle County. He is the brother-in-law of the owner of Goochland Cave, Albert Schweitzer of West Milton, Ohio. Schweitzer indeed owns Goochland's main entrance and a great deal of property surrounding it.

On September 7, 1975, Tim Kettering and I visited Mr. Schweitzer and his family, talked a long while and showed maps and slides. Mr. Schweitzer had never seen Jim Rebmann's Caves of Rockcastle County and was unaware of the immensity of his cave. He was thoroughly impressed by our interest in him and Goochland and said that SWORCA was welcome there even if he decided to close the cave, although he had no intentions of doing so.

Mr. Schweitzer intends to hold the property as a long-term investment and perhaps pass it on to his children. Goochland will remain as it has been, a beautiful and secluded entrance along Crooked Creek.



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Caver/Cave Owner Relations

By Ray McAdams

In the past, cave conservation was concerned primarily with the protection of cave formations and elimination of unsightly litter or markings in caves. With the increased visitation pressures imposed on caves throughout the United States, we find ourselves confronted with yet another aspect of cave conservation. The danger of loss of access to well known and extensive cave systems. Many caves of even modest size have already been closed to caving near populus areas. Since verbal refusal to cavers is not an effective deterent, a few cave owners have physically closed their caves.

The refusal of cave owners to permit spelunkers entrance to their cave is generally the result of one of two major reasons. One, they may have had visits by irresponsible cavers that failed to recognize the privilege extended to them and their responsibilities to conduct themselves in a polite manner. Two, some owners are fearful of legal liabilities in the event that cavers are injured while entering or passing through their cave. This fear by the owners is partly justified by accident reports occassionally appearing in newsprint and TV news coverage. Because some cave owners live in remote regions of the country many cavers (especially those from large cities) aren't aware of how up to date on current events they are. Publicized cave accidents certainly gain the attention of the rural cave owners.

How to protect desirable caves from closure is a problem that requires different techniques in nearly every instance. If the cave has been closed due to the rude activities of cavers, an organized group of responsible cavers may offer to repair any damages caused by the undesirable minority. The attempt (even though unsuccessful) by friendly cavers to find the guilty party, I am sure, would also be appreciated by the cave owner. This kind of effort might only be justified by the closure of a major cave system.

Concentrated indoctrination toward caving courtesy should be a regular feature of Grottos toward all cavers they contact. Increased contact can be obtained by placing visitor registors in all heavily traveled caves in the Grotto area.

If a map has been made of a cave, a copy of the map should be presented to the owner. It may be pointed out how he can use this information to locate underground water, if such is abundant and near the surface. Any other benefits the cave can be to it's owner should also be pointed out.

Being nice to a cave owner may do more than just get a return visit to his cave. For every cave on his farm he probably knows of five more. Having hunted in his community for years he most certainly has seen some or has at least heard of a few from his hunting partners. If your friendly enough, after a few return visits he may even ask around for you. A local resident can gleen information you may never get.

When animals are collected for scientific purposes, explain why they were collected and tell the owner of some interesting aspect of cave biology.

When caves are photographed the problem of presenting the owner copies of the pictures becomes more complex. Good pictures of cave formations are impressive to most anyone. Unfortunately a few good pictures of spectacular formations may cause the owners to think in terms of commercializing their cave. In a case such as this, the cave is rarely worth commercialization, but the end result is that the owner may close the cave to cavers to protect its contents (a selective closure may be beneficial).

Occassionally a cave owner will refuse admittance to his cave for fear that the cavers will return many times and ultimately make a general nusiance of themselves. An understanding with the owner to the effect that only limited excursions into the cave would occur may prove effective. Possibly one visit every three months would be agreeable to both parties.

The cave owner may want to restrict visitation to only those he feels responsible. Knowing this, an organized caving group may offer to erect a gate at the entrance in exchange for the right of members to visit the cave. This would protect the owner against continued visits by cavers not under guidance and supervision of the responsible group or himself.

Some cave owners store preserves or other produce in their cave, or collect their drinking and irrigation water from the cave. The gate would protect their valuables. Advance scheduling of visits to the cave would avoid arrival at the cave when the owner was planning to collect drinking water. A letter to the owner explaining why you wished to enter the cave and when, accompanied with a self-addressed reply post card may be very effective. The post card must be simple and convenient for the owner to mark and mail. The following is an example of such a card:

> **Yes, you may enter my cave on Sept. 27 ☐ Sept. 28 ☐ please check one or both.**
>
> **Is there a time you would prefer us to arrive? If so, please specify.**
>
> **Please note any additional comments or restrictions.**
>
> **Thank You,**
> **(signature)**

The fear of legal reprisal resulting from accidents to cavers while on a cave owner's property has resulted in the closure of many caves. Although legally the cave owner should not be held responsible for accidents unless he charges admission to his cave, few cave owners are aware of this.

The legal release form shown below, though simple in structure is adequate, and has provided access to caves that were otherwise closed.

> **We the undersigned agree to relieve the owner(s) of (name of cave) from any legal responsibility for any accident resulting in injury or death while entering, being within, or leaving his/her or their cave.**
>
> **1.** . . . . . .
> **2.** . . . . . .
> **3.** . . . . . .
> **4.** . . . . . .
> **5.** . . . . . .
> **6.** . . . . . .
> **7.** . . . . . .
> **8.** . . . . . .

Remember if minors are going into the cave with you, their parents must co-sign with them. They could have a parent sign two or three forms, before leaving on the caving trip. It would be a shame to have a sharp owner realize a minor's signature is not binding and make them sit in the car while you enjoy his cave.

In addition to the legal release form, giving him a description of the safety precautions taken while entering and passing through the cave helps to relieve some of the anxieties the cave owner may have.

First and foremost, one must always remember that the cave owner is extending to you the privilege of entering his cave (generally with nothing in return for this privilege). Without his gracious consent you have no right to enter his cave. By entering without permission you not only jeopordize your own legal (if not physical) safety, but also penalize all other cavers that may wish access to the cave. I would like to repeat a valuable NSS motto. "Take nothing but pictures, leave nothing but footprints, **and goodwill.** Don't just believe in it, follow it. You and generations of cavers after you will benefit from it.



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Photo by Pete Miller

John Clark and Mrs. Clark have patiently endoured a stream of traffic to their cave, Climax. The Clark's have also been very helpful in letting us use the Speleohut and have extended every courtesy to SWORCA. John and his family raise fine cattle and justifiably so, as they enjoy their work.

Matthew Powell and Mrs. Powell
Here are some of the nicest residents of the Crooked Creek Valley. SWORCA knows them well and cavers are more than welcome to stop in for a visit. Just park near the 1-ton bridge, "You cain't meice it!"



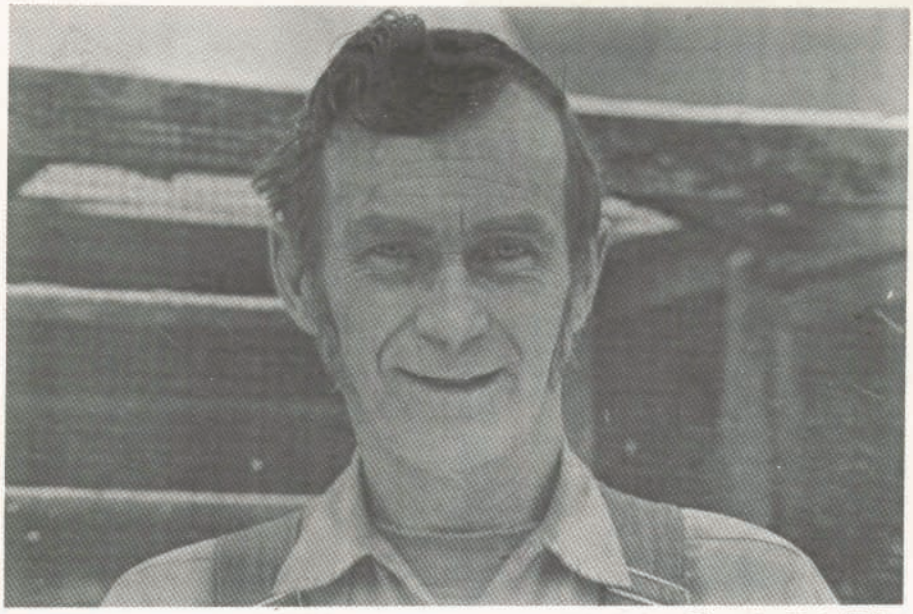
Photo by Pete Miller



Photo by Pete Miller

Alvin Rice—On a routine ridge-walking trip. Tim Kettering first found Alvin Rice's farm and asked if there were any caves around. Mr. Rice then told Tim about a pit by a poplar tree. Alvin explained that the cave blew a large amount of air and no one had ever been down it. SWORCA checked it out and later connected it to Goochland Cave, miles away. Our thanks to Mr. Rice for permission to enter Poplar Pit.

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JOHN COPE – ACE MECHANIC, FARMER, CAVE OWNER, FRIEND

Photo by Pete Miller

Moonshine Still—Tom Owen's Handicraft (Note the tree-top lookout).

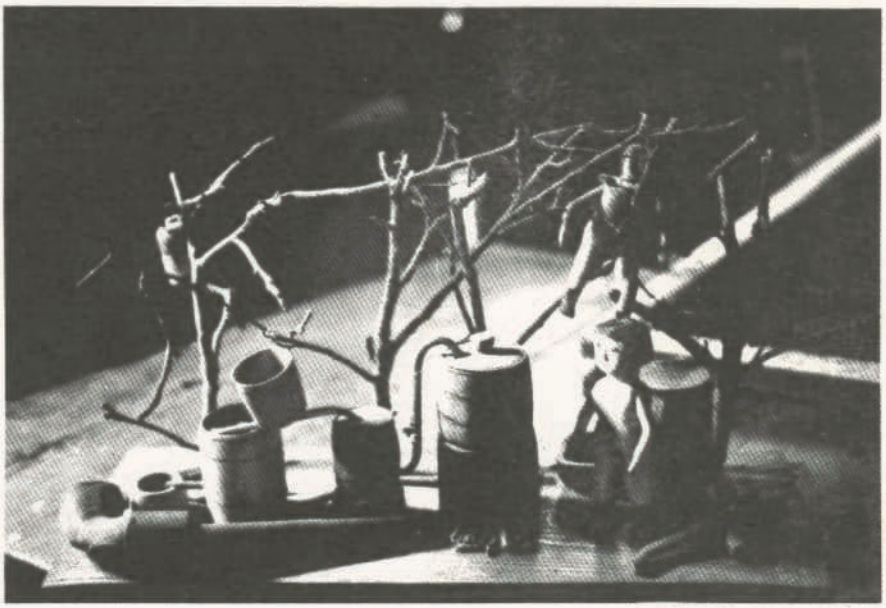
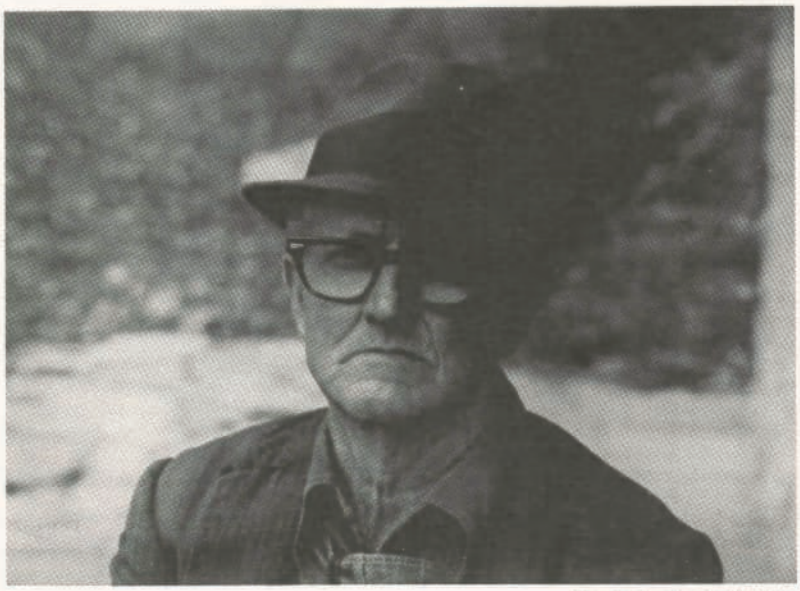


Photo by Rick Sellers



RICHARD MULLINS OWNER OF FAMOUS GREAT SALTPETRE CAVE

Photo by Pete Miller

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SWORCA'S Dedication to Goochland

By Mary Gratsch

The following is an account of the hard work, long hours, accomplishments, setbacks and dedication of the SWORCA members to explore, map and photograph a major cave system.

It all began by uncovering a mile of virgin passage beyond the "First Breakdown" in the righthand passage of Goochland. Prior to this discovery, Goochland had been mapped to approximately 12,000 feet, mostly on the left side passages.

The initial interest generated by our first discovery has led us on for over two years adding more mileage to the Goochland System. The more time we spent in the Goochland Valley the better we came to know the surface topography and the more cave entrances we found (such as Barn Sink, and Penitentiary). We know the water in these caves flows into Goochland, but whether the connections are humanly possible to make we have yet to find out.

The trips summerized in this article by no means represent all our caving in the Johnetta Quad. Rather it shows only the trips we have taken in the Goochland-Poplar System and other related caves.

These caves are: Barn Sink, Kitchen Sink, Crooked Creek Cave and Penitentiary Hole.

7/5/73 First SWORCA meeting, 7:00 p.m. Student Union Bldg. at U.C.

8/5/73 Goochland—First breakdown breakthrough. Explored the main trunk passage and side leads of the Miracle Mile. (All virgin) 9 a.m.-2 p.m. (5 hrs.); Marv Knasel, Ed Hawkinson, Pete Miller, Ann Marie Wilder, Tim Kettering, Rick Sellers, Dave Harris and Mary Gratsch.

8/19/73 Goochland—Mapped the Miracle Mile (Started at the beginning of the First Breakdown Pile and surveyed to the beginning of the Second Breakdown Pile). Tried to push the Second Breakdown—unsuccessful. 89 stations, 6060.5 feet. 8:30 a.m.-4:45 p.m. (8 hrs., 15 min.) Pete Miller, Tim Kettering, Marv Knasel, Ed Hawkinson, Rick Sellers, Dave Harris and Mary Gratsch.

10/13/73 Smokehole—Looked for connection to Goochland—unsuccessful. 3 p.m.-7 p.m. (4 hrs.) Pete Miller, Marv Knasel, Larry Wuest, Ken Tankersly, Rick Sellers, Tim Kettering and Mary Gratsch.

10/14/73 Kitchen Sink—Dug open (also explored other sinks in Goochland Valley) 9 a.m.-2 p.m. (5 hrs.) Rick Sellers, Tim Kettering.

11/11/73 Kitchen Sink—Explored. 10 a.m.-1 p.m. (3 hrs.)
Smokehole—Tried to find connection to Goochland. 2 p.m.-7 p.m. (5 hrs.) Dave Harris, Tim Kettering, Rick Sellers, Mary Gratsch.

11/24/73 Goochland—Upper level off the Miracle Mile first discovered and explored. 9:30 a.m.-5:30 p.m. (8 hrs.) Pete Miller, John Evans, Rick Sellers and Mary Gratsch.

12/1/73 Goochland—Left Side. Tried to find connection to Smokehole—unsuccessful. 6:30 p.m.-11:30 p.m. (5 hrs.) Pete Miller, Marv Knasel, Jim Case and Mary Gratsch.

12/22/73 Cave Radio tested at Goochland's Entrance; 10 a.m.-12 p.m. (2 hrs.)
Goochland—Upper Level off Miracle Mile explored; 1 p.m.-4 p.m. (3 hrs.) Pete Miller, Tom Miller, Paul Miller, Tim Kettering, Rick Sellers, Dave Sligar and Mary Gratsch.

1/11/74 Cave Radio tested in Climax Cave—successful. 10 p.m.-11:30 p.m. (1½ hrs.) Rick Sellers, Tim Kettering and Mary Gratsch.

1/12/74 Goochland—Explored side leads in Miracle Mile, set up cave radio at Second Breakdown—successful; 10 a.m.-2 p.m. (4 hrs.) Tim Kettering, Rick Sellers, Pete Miller, Dave Harris, Bill Hastings, Al and Paul Gademsky, Dave Sligar and Mary Gratsch.

1/20/74 Radio Sink—Dug in hopes of making another entrance to Goochland—unsuccessful (too solidly clogged) 9:30 a.m.-3 p.m. (5½ hrs.) Werner Jud, Rick Sellers, Tim Kettering and Mary Gratsch.

2/9/74 Barn Sink—Explored and tried to connect it to Goochland—unsuccessful; 8:30 a.m.-12:30 p.m. (4 hrs.) Tim Kettering, Werner Jud, Pete Miller, Marv Knasel and Mary Gratsch.
Sinks near Three Links—Explored; 1 p.m.-7 p.m. (6 hrs.) Tim Kettering, Werner Jud and Mary Gratsch.
"Lawn-ney" Night in Climax Cave.

2/10/74 Goochland—Pushed the Second Breakdown—unsuccessful. Found promising lead, but became blocked by boulder; 11 a.m.-5:30 p.m. (6½ hrs.) Werner Jud, Tim Kettering and Mary Gratsch.

2/23/74 Goochland—Removed boulder from lead in Second Breakdown; 10:30 a.m.-5:30 p.m. (7 hrs.) Werner Jud and Matt Cholmondeley.

3/18/74 Goochland—Broke through the Second Breakdown, set up cave radio in Miracle Mile—successful; 10:30a.m.-5 p.m. (6½ hrs.) Tim Kettering and Mary Gratsch.
Radio Tracking on Surface: John Evans and Rick Sellers.

3/24/74 Goochland—Explored beyond the Second Breakdown. Found the Biggest Room, stream level and the Sinks; 10 a.m.-3:45 p.m. (5 hrs., 45 min.) Rick Sellers, Tim Kettering and Mary Gratsch.

4/6/74 Goochland—Mapped through Second Breakdown; 51 stations, 1871.8 ft.; 11 a.m.-9:50 p.m. (10 hrs., 50 min.) Rick Sellers, Tim Kettering and Mary Gratsch.

5/4/74 Goochland—Pushed side passages beyond the Second Breakdown. First assault on Calvary Crawl—unsuccessful; 9:30 a.m.-5 p.m. (7½ hrs.) Pete Miller, Marv Knasel, Dave Harris, Tom Gracanin, Rick Sellers, Tim Kettering and Mary Gratsch.

6/1/74 Lower Two-Way Sink—Dug into, tried to open passages leading to Goochland—unsuccessful. 10 a.m.-1 p.m. (3 hrs.) Rick Sellers, Tim Kettering and Mary Gratsch.
Goochland—Attempted to survey from the entrance to the First Breakdown—unsuccessful, caught in flash flood on the Goochland Road; 2 p.m.-6 p.m. (4 hrs.) Rick Sellers, Tim Kettering and Mary Gratsch.

6/9/74 Goochland—Left and Right Sides; placed conservation signs 9 a.m.-10 a.m. (1 hr.) Tom Gracanin and Mary Gratsch.
Crooked Creek Springs—Explored; 10 a.m.-10:30 a.m. (½ hr.) Tom Gracanin and Mary Gratsch.

6/22/74 Goochland—Set up cave radio in the Biggest Room—successful. Explored stream level (first major assault on Calvary Crawl, pushed approx. 45 minutes on way—unsuccessful; 9:50 a.m.-6:30 p.m. (8 hrs., 40 min.) Pete Miller, Werner Jud and Mary Gratsch.
Cave Radio—Plot on Surface—successful; (1½ hrs.) Rick Sellers and Tim Kettering.
Kitchen Sink—Explore; 5 p.m.-8 p.m. (3 hrs.)

7/6/74 Goochland—Survey from First Breakdown to entrance; 33 stations, 1895.6 ft.; 10:45 a.m.-2 p.m. (3 hrs, 15 min.)
Goochland—"A" and "B" surveys (upper levels of Miracle Mile); 51 stations, 1814.1 ft.; 2:30 p.m.-9:30 p.m. (7 hrs.) John Evans, Rick Sellers, Werner Jud and Mary Gratsch.

7/13/74 Cave Radio—Set up at end of "B" survey—unsuccessful. Carried out "C" and "D" surveys; 25 stations, 1009.6 ft.; 10 a.m.-6 p.m. (8 hrs.) Tim Kettering, Rick Sellers, Dave Kelly and Mary Gratsch.

8/25/74 Crooked Creek Springs—Checked (1 hr.) Rick Sellers, John Evans and Mary Gratsch.

9/14/74 Goochland—Explored side leads off Miracle Mile and from entrance to First Breakdown; 4 p.m.-9 p.m. (5 hrs.) Werner Jud, Pete Miller, Tim Kettering, Rick Sellers amd Mary Gratsch.

9/15/74 Sinks near Three Links—Re-explored, 2 p.m.-3 p.m. (1 hr.) Werner Jud, Pete Miller, Rick Sellers, Tim Kettering and Mary Gratsch.

9/28/74 Goochland—Discovered the Bhudda Passage, installed a register in the room with the curtained rock; 10:30 a.m.-5 p.m. (5½ hrs.) Tim Kettering, Rick Sellers, Werner Jud and Mary Gratsch.

9/29/74 Goochland—Enlarged the Crack-Up, set up cave radio in the set of domes in the Bhudda Passage—unsuccessful; 11-:10 a.m.-6 p.m. (5 hrs., 50 min.) Rick Sellers, Werner Jud, Tim Kettering and Mary Gratsch.
Poplar Pit—Entrance discovered by Tim Kettering while looking for the radio point.

10/5/74 Goochland—Cave radio set up at Trickling Breakdown—successful. Discovered and explored part of Bhudda's upper levels; 9:30 a.m.-8:40 p.m. (11 hrs., 10 min.) Rick Sellers, John Evans and Mary Gratsch.
Poplar Pit—60-ft. pit discovered, tracked radio point; (4 hrs.) Werner Jud.

10/5/74 Cave radio depth reading taken on Trickling's radio point—successful (100 ft. below the surface) 12:30 a.m.-4:30 a.m. (4 hrs.) Werner Jud, Rick Sellers.
Poplar Pit—First descent, explored main bore downstream past the Judgment Room. 12 p.m.-5 p.m. (5 hrs.) John Evans, Rick Sellers, Werner Jud and Mary Gratsch.

10/12/74 Goochland—Pushed upper level leads off Bhudda Passage, discovered Stardust Cascade. Set up a temporary camp; 10:30 a.m.-9 p.m. (10½ hrs.) Rick Sellers, Marv Knasel, Werner Jud, Pete Miller and Mary Gratsch.

10/13/74 Poplar Pit—Surveyed virgin northeast passage and began survey to the southwest; 53 stations, 1248.6 ft.; 10:30 a.m.-4:30 p.m.; (6 hrs.) Rick Sellers, Pete Miller, Werner Jud, Tim Kettering, Marv Knasel and Mary Gratsch.

10/26/74 Goochland—Discovered the Ram Room and Pipe Organ Pit, added more essentials to the camp, explored more of the mazy, dome complex; 10:30 a.m.-10:30 a.m. (24 hrs.) Pete Miller, Werner Jud and Mary Gratsch.

11/9/74 Poplar Pit—Explore side leads, push beyond our last penitration to the west—unsuccessful. 2:15 p.m.-10:30 p.m. (8 hrs., 15 min.) Tom Gracanin, Tim Kettering, Rick Sellers and Mary Gratsch.

11/16/74 Surface Reconnaissance—Explored the

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The Beginning—With No End In Sight

By Mary Gratsch

Marv Knasel, Ed Hawkinson, Pete Miller and Ann Marie Wilder were already suited up and waiting, when Rick Sellers, Tim Kettering, Dave Harris and myself arrived at Goochland Cave on August 5, 1973. The purpose of the trip was to try, for about an hour, to find a way through the First Breakdown Pile on the right fork trunk passage. If we were not successful, we planned to spend the remainder of the day exploring the "Left Side" for a possible connection to "Smokehole Cave."

At 9 a.m. we started into the cave. The enormous size of the entrance really amazed us. About 200-ft. in, Rick pointed out a passage taking off from the left-hand wall. He told us it opens into the "Left Side Passages," an extensive network of more than 14,000 mapped feet. (At this time it was considered the major section of the cave.) The immense passage we were following continued on for another 1800-ft. before tapering down into a breakdown pile.

At this point we split up so we could explore as many holes as possible. Any place big enough to squeeze into was pushed as far as humanly possible. After a half hour Tim spotted a crack where he heard water surging beneath the rocks. Everyone took a turn at moving the rocks in hopes of reaching the stream level. I watched for a few minutes, then noticed a fairly obvious place I didn't remember anyone checking. I slipped over there and began pushing leads. I climbed up a narrow canyon passage, looked around and saw a thin ledge backtracking over what I had just ascended. Gazing at it, I thought, "This is just like in those adventure movies." (I hadn't been into caving very long) and proceeded to traverse it. When the ledge ended, the only way left to go was the opening between two boulders. I squeezed through and found myself in a small room with many side leads. After checking most of the holes, I noticed a particularly good looking one on my right. I walked over there and felt a very definite breeze issuing from it. Although there were many footprints in the room, only a single set led over to and away from this passage. None entered it. (I found out later that these prints belonged to Jim Currens and a friend. They had reached this point and turned back.) Suddenly I thought of the time. I had been gone from the group for a half hour and could no longer hear them. Picking my way back, I yelled frequently until Rick answered. He had come back to find me, while the rest of the group waited at the beginning of the first breakdown.

I told Rick about the virgin passage with the wind. We immediately went back to it and began exploring. After a short crawl it opened up at the top of a 20-ft. slope. The sound of rushing water came from the bottom. We carefully made a descent. Five feet from the floor we felt a very strong breeze issuing from the blackness below. Realizing we had just climbed over the top of the first breakdown and were once again in the main bore, we still were not convinced that the crawlway would open up "big." Another 40-ft. further we decided this was "it" and hurried back to the rest of the group.

We found the others and told of our dicsovery. The excitement Rick and I felt was very contagious. Trucking out right away, everyone forgot about Pete, who had gone back to the entrance to put his camera away and had not yet returned. To mark the way out of the breakdown, I placed a little flashlight on a boulder and left it on.

At the slope leading down off the breakdown, we had to descend single file, since every footstep caused an avalanche of loose rock and mud. We quickly crawled past where Rick and I had stopped. The wind urged us on through a water-crawl. After a ceiling height of 3 feet for about 500-ft. the passage became a 4 to 5-ft. high stoopway, which lasted about 400-ft. All of a sudden the passage opened up. From here on the average ceiling height was 20-ft. and the width of the passage was from 10 to 25-ft. It was bigger than any of us had ever imagined. (We believe it was completely virgin.)

The passage was fairly straight and without many side leads. A large 50-ft. dome with showers on our left really caught our eyes. We followed the canyon passage that led out of it until it ended in another smaller dome. Avoiding the pools when we could, wading across the sometimes waist-deep water when necessary, we trucked upstream. The ecstasy our group felt was even further heightened by the sight of such formations as the "Tiger Paw," "Bacon Bypass," "The Fins," "The Drinking Fountain" and super colored flowstone.

As suddenly as the passage opened up after the "First Breakdown," it closed with yet another (The Second Breakdown) pile. At this point we were convinced that this section of the cave was virgin. Before we started to walk around on the breakdown there were no other footprints to be seen anywhere. However, everyplace we stepped left a "very" noticable track. The breakdown room is well above the flood level of the stream.

While the passage was going "big," none of us had the will power to turn around and go back to find Pete, but as soon as we reached the "Second Breakdown" he became our primary concern. Pete, upon reaching the "First Breakdown" and finding us gone, surmised that we had found our way through. Setting out to find us, he followed the stream under the breakdown, a very small, wet passage. He came out at the bottom of the slope he had ascended, and knew he was on the right track when he saw my flashlight shining. He then noticed footprints heading back to where he had just come. He returned and continued to follow the water upstream until we met him at the "Tiger Paw." By 2 p.m. we had reached the cave entrance and decided to enjoy the sunshine for a little while. Outside at our camp, we excitedly made plans for mapping the new section we had just found, and vowed to break through the "Second Breakdown" no matter how long it took.

On a survey trip the next weekend, we found that this new section was better than a mile long. Hence the passage between the "First" and "Second" breakdown piles is called the "Miracle Mile." Little did we realize that we would be spending the next two years and some 150+ hours, exploring and mapping the Goochland Cave System. After discovering more than 5 miles of virgin passage, there still is no end in sight and we have no intentions of quitting now!!!



Photo by Pete Miller

"PHANTOM CAVER"

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Science Report: BATS

Bats are very specialized creatures. They belong to the class Mammalia and the order Chiroptera. Bats are warm blooded, have a body coating of hair, bear live young, breathe through lungs and nurse their young through mammary glands as characteristic of most members of their class. But they are unique among mammals because of their ability to fly.

Their "wings" are leathery membranes stretched between very elongated fore "fingers," their front feet and extends back to the outer aspects of their hind legs. Another membrane extends from the inside of the hind legs to the tail leaving the hind feet themselves free for gripping as the bat hangs upside down in its roost. The thumbs of the forefeet are small, equipped with sharp claws and not connected to the membranes. These two claws (one on each "wing") are used to dig parasites out of the fur during grooming.

Although their eyes are very small, bats are not blind and those that fly by day may use their eyes to some extent. Most manoeuvering, however, requires the use of echo location. Very high pitched sounds, which are above human hearing, are emitted from the bat's mouth, usually at a rate of thirty per second and a frequency that starts about 3000 cycles and ranges upward to 60,000 cycles or higher. The bat manoeuvres by analysing the echoes that bounce back off trees, buildings etc. The pattern formed by the echoes tells the bat of obstacles, their size, shape and location. To prevent confusion between the signals and the echoes, bats are able to contract muscles in their ears to cut off their own signals as they emit them, opening them to receive the echoes.

It is known that when a bat is in a familiar place, like his roosting cave, he will not use his echo location to navigate. Somehow he is able to memorize the route and its obstacles making echo location unnecessary. Scientists are not sure how this is done, as of yet, but it is proven that the do not always use echo location because if an obstacle is placed in a cave passage which the bats frequently use, the first ones of the group will crash into the object while the rest will avoid it by using their echo location.

Echo location is also employed in catching their prey (assuming they are insect eaters or insectivores). As a bat swoops down on a flying insect, its cries increase in number to as many as fifty to sixty per second. This enables the bat to catch his prey using his wing or tail membranes like a small net, with amazing accuracy. The bat is considered one of the most successful hunters because of the rarity at which he misses capturing his food.

Because the ears (which are greatly elongated and very fragile looking to catch vibrations better) play an important function in echo location they must be kept meticulously clean. Before settling down for a days sleep most bats will spend time, sometimes hours, grooming themselves.

Winter is the time cavers are most likely to see bats in caves, although certain species do not dwell in caves and others are found there year round. Winter is the time of hibernation for many northern species of bats.

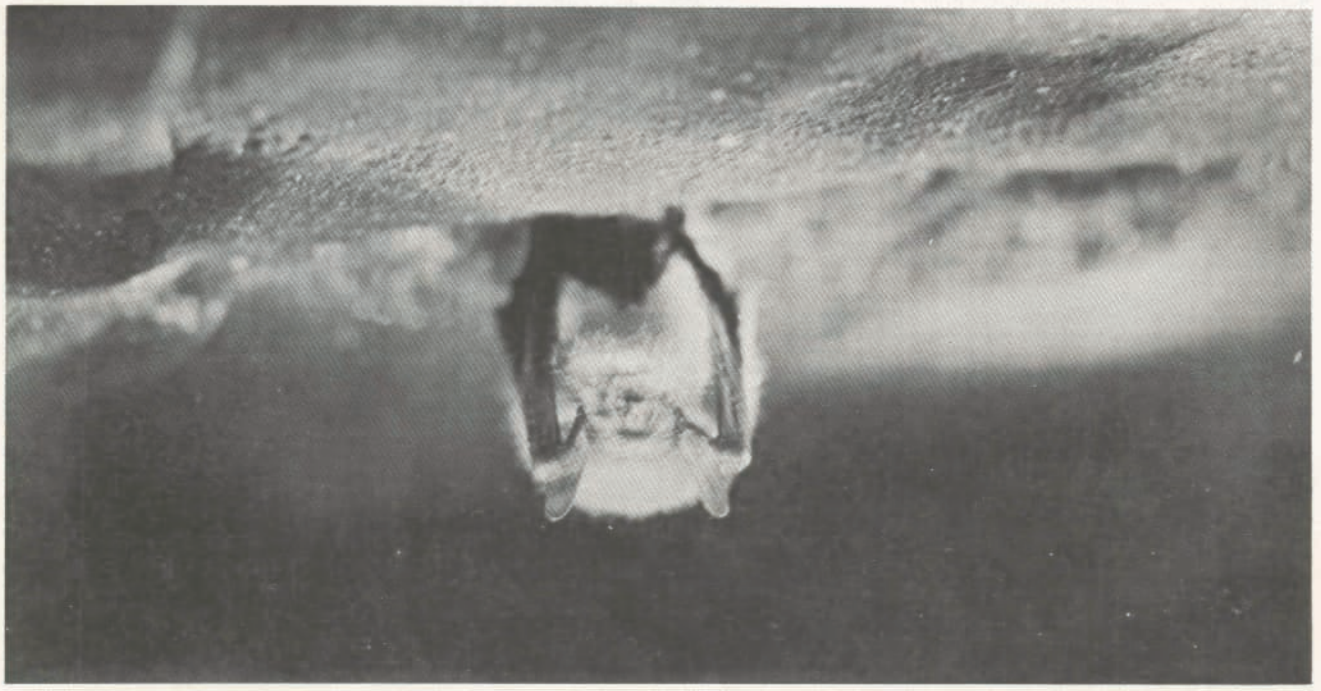
Bats go into a true period of dormancy or hibernation. Their heartbeat slows down considerably, the blood flows slower, the metabolism rate is greatly reduced, and their overall body temperature drops. The bats tend to prefer small niches or pockets in the ceiling of the cave where there is usually little air flow and the humidity and temperature are constant. These things are important or the bat might freeze to death. Only rarely do they awaken during this time because the speeding and warming up of the body requires great amounts of energy. This energy comes in the form of fat which the bat accumulated the Fall before. If he uses up all this fat before the weather turns warm, he will die of starvation. **For this reason no one should ever disturb a bat especially during his hibernation period.**

I hope this report has given you a little insight into the life of the bat, but as you can see only a small portion of it is known. It is hoped that through the use of bat bands (usually placed on the tail membrane) the story of their migration and hibernation habits will become known to man. You can help. If you should ever see a band on a bat please write down the tag number and the time and place whiere the bat was seen. Send this information together with your name and address to the Fish and Wi ldlife Department. Here it will be marked on the permanent files of that bat along with the other sightings if any. This gathered information may help clear up at least one of the mysteries of some species of bats; that of where they go at certain times of the year.

Mary Gratsch

References: Caras, Roger A.—North American Mammals.

Powell, Braun, Kleiman, Kypta—Animals of the World—North America.



HANGING HIBERNATER

Photo by Pete Miller

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hill above Goochland entrance (3 hrs.) Rick Sellers, Werner Jud and . Mary Gratsch.

11/30/74 Goochland—Surveyed part of Bhudda Passage, trapped by a flash flood; 38 stations, 2013.5 ft.; 11:30 a.m.-9:30 a.m. (22 hrs.—6 hrs. spent mapping) Pete Miller, Werner Jud and Rick Sellers.

12/21/74 Goochland—Completed survey of Bhudda Passage to Trickling Breakdown; 26 stations, 1071.9 ft.; 11:30 a.m.-5:30 p.m. (6 hrs.) Pete Miller, Jim Miller, Rick Sellers, Mary Gratsch. Three additional hours by Werner Jud.

12/28/74 Surface Reconnaissance—Explored area between Trickling Breakdown radio point and the entrance to Poplar Pit (4 hrs.) Rick Sellers, Mary Gratsch and Werner Jud.

1/4/75 Goochland—Beyond the waterfall, added more supplies to the camp, explored part of the dome complex; 12 p.m.-10:30 p.m. (10½ hrs.) Mary Gratsch, Werner Jud and Rick Sellers.

1/5/75 Comparison of actual area of Radio Sink to map of Johnetta Quad; found several omitted sinks, road and house changes; 11 a.m.-3 p.m. (4 hrs.) Mary Gratsch, Rick Sellers and Werner Jud.

1/18/75 Goochland—"E" Survey; 16 stations, 413.2 ft.; 1 p.m.-7 p.m. (6 hrs.) Pete Miller, Mary Gratsch and Rici Sellers.

3/8/75 Goochland—Left Side—Photography; 3 p.m.-7 p.m. (4 hrs.) Mary Gratsch, Rick Sellers, Werner Jud and Craig Zimber.

4/12/75 Goochland—Camp set up on right side. Fixed a plastic tent, took in clothing, sleeping bags, air mats and other essentials. Discovered Sand Camp; 10-:30 a.m.-3:30 p.m. the following day (29 hrs.) Tim Kettering, Werner Jud, Pete Miller, Rick Sellers and Mary Gratsch.

5/10/75 Surface Reconnaissance—Hiked up Barn Sink Valley to find large sink indicated on the topo map; 12 p.m.-3 p.m. (3 hrs.)Drano Pit discovered, plugged solidly at bottom. Penitentiary Hole and Pits discovered (Mose Anglin and family took us to it) preliminary exploration showed potential; (3 hrs.) Rick Sellers and Mary Gratsch.

5/11/75 Poplar Pit—Discovered upper level maze, attempted to push watercrawl to the southwest—unsuccessful; 8 a.m.-6 p.m. (5 hrs.) Tom Gracanin, Mary Gratsch. 8 a.m.-4 p.m. (8 hrs.) Werner Jud, Tim Kettering, Rick Sellers.

5/17/75 Surface Reconnaissance—Relocated Penitentiary Hole and Pits, checked sinks in Goochland Valley (they had changed a great deal since we last saw them) 11 a.m.-3 p.m. (4 hrs.) Rick Sellers and Mary Gratsch.

5/24/75 Penitentiary Hole—First expedition. Pushed upstream; Marv Knasel, Becky Pierce; 11 a.m.-1 p.m. (2 hrs.) Pushed downstream to Fourth Breakdown. Tried to get through—unsuccessful. 11 a.m.-4 p.m. (5 hrs.) Tim Kettering, Werner Jud, Mary Gratsch, Rick Sellers and Pete Miller.

5/25/75 Poplar Pit—Dumped dye, put filters at Goochland entrance, Left Side Springs and Crooked Creek Springs—unsuccessful. (4 hrs.) Tim Kettering, Dave Sligar, Rick Sellers, Werner Jud and Mary Gratsch.
Ridge Running—Three Links Area—successful, found new sinkholes (5½ hrs.) Werner Jud and Tim Kettering.

5/26/75 Penitentiary Hole—Surveyed, 34 stations, 809.3 ft.; (5 hrs., 15 min.) Pete Miller, Rick Sellers, Mary Gratsch, Werner Jud and Tim Kettering.

6/8/75 Penitentiary Hole—Cave radio set up at Fourth Breakdown, unsuccessful. 10 a.m.-5 p.m. (7 hrs.) Rick Sellers, Bill Gratsch and Mary Gratsch.

6/15/75 Penitentiary Hole—Explored side leads (6 hrs.) Tim Kettering and Werner Jud.

6/28/75 25-hour trip—Goochland, Mapped from Camp's pit area to the Ram Room, 78 stations, 1 a.m.-2 a.m. (25 hrs.—10 hours spent mapping) Pete Miller, Mary Gratsch, Werner Jud, Tim Kettering and Marv Knasel.

7/12/75 Barn Sink—Pushed side leads, added another 100 ft. of virgin passage (3 hrs.) Rick Sellers and Mary Gratsch.

7/18/75 Goochland—Photography Trip past the Second Breakdown, 11 a.m.-4 p.m. (5 hrs.) Rick Sellers and Mary Gratsch.

7/19/75 Overland Survey—Mose Anglin's house to Penitentiary Hole, (1 hr.)
Penitentiary—Surveyed from station #34 to Fourth Breakdown, pushed breakdown and sideleads—unsuccessful; 13 stations, 973.5 ft. (7 hrs.) Rick Sellers, Craig Zimber, Tim Kettering and Mary Gratsch.

7/20/75 Overland Survey—Goochland entrance to first fork in the road (1 hr.)
Overland survey—Barn Sink entrance to "A" in road (20 min.) we then surveyed Barn Sink, 25 stations, 580.4 ft. 12:15 p.m.-4:30 p.m. (4 hrs., 15 min.) Rick Sellers, Tim Kettering, Craig Zimber and Mary Gratsch.

8/23/75 Goochland—Connection made to Poplar Pit—successful. Pushed Calvary Crawl; 8 a.m.-4 p.m. (8 hrs.) Werner Jud, Marv Knasel and Pete Miller.

8/30/75 Poplar Pit—Rigged rope (1 hr.) Rick Sellers and Mary Gratsch.

8/31/75 Poplar Pit—Survey continued; 77 stations, 1266.1 ft. 8 a.m.-5 p.m. (9 hrs.) Tim Kettering, Werner Jud, Rick Sellers and Mary Gratsch.

9/20/75 Poplar Pit to Goochland connection surveyed; 41 stations, 1376.4 ft. 6 p.m.-6 a.m. (12 hrs.) Pete Miller, Rick Sellers, Werner Jud, Tim Kettering and Mary Gratsch.

9/27/75 Goochland—Surveyed last phase of tie-in to Poplar; 6 stations, 182.2 ft.; Rick Sellers, Greg Maue, Tony Wetzel, Dave Harris and Mary Gratsch.

10/18/75 Penitentiary Hole—Explored upper level; 9:30 p.m.-3 a.m. (5½ hrs.) Pete Miller, Werner Jud and Marv Knasel.

10/26/75 Overland compass readings taken from Poplar Pit entrance to houses in Three Links and Alvin Rice's Home; (1 hr.) Tim Kettering, Werner Jud, Rick Sellers, Pete Miller and Mary Gratsch.

11/15/75 Goochland-Smokehole Valley ridge-running. Found two small caves on the Goochland side of the valley, located 1938 benchmark 11 a.m.-3 p.m. (4 hrs.) Rick Sellers, Tim Kettering, Werner Jud and Mary Gratsch.

11/16/75 Kitchen Sink—dug open, (1 hr.) surveyed 47 stations, (5 hrs.) Tim Kettering, Rick Sellers, Werner Jud and Mary Gratsch.

11/22/75 Poplar Pit—Photography of Helectite Heights and exploration of canyon passage levels; 11 a.m.-9 p.m. (10 hrs.) Pete Miller, John Miller, Marv Knasel, Becky Pierce, Werner Jud, Rick Sellers and Mary Gratsch.

12/6/75 Goochland—Photography of the Miracle Mile, explored part of the upper level (virgin) (6½ hrs.) Jamie Kettering, Tom Wittacan, Mary Gratsch.

12/20/75 Crooked Creek Cave—Checked out rumor that it comes out on Horse Lick—unsuccessful. (1 hr.)
Goochland—Right Side, pushed the First Big Room, the Sinks along the stream level and sump under Calvary Crawl; (8½ hrs.) Tim Kettering, Rick Sellers and Mary Gratsch.

The statistics in this article are summaries of very detailed trip logs I have kept on each expedition. They are as accurate as I can make them. I'd like to thank Werner Jud and other SWORCA members for giving me the information to fill in the gaps of the trips I wasn't on.

The Goochland System

Time Spent Exploring—	
Goochland-Poplar	175 hrs.
Penitentiary	16.5 hrs.
Barn Sink, Kitchen Sink, Others	33 hrs.
Time Spent Surveying—	
Goochland-Poplar	96.5 hrs.
Penitentiary	24.5 hrs.
Barn & Kitchen Sinks	10.5 hrs.
Time Spent with Cave Radio—	
Goochland-Poplar	29 hrs.
Penitentiary	7 hrs.
Trials in other caves	7 hrs.
Time Spent in Overland Surveys	3 hrs.
Time Spent Digging in Sinks	10.5 hrs.
Time Spent Developing SWORCA Base Camp (right side)	46 hrs.
Time Spent Dye Tracing	4 hrs.
Time Spent in Surface Reconnaissance	42 hrs.
Time Spent in Cave Photography	17 hrs.
TOTAL HOURS	521.5 hrs.



ACT LIKE YOU'RE FALLING TIM!

Caver's Quotes

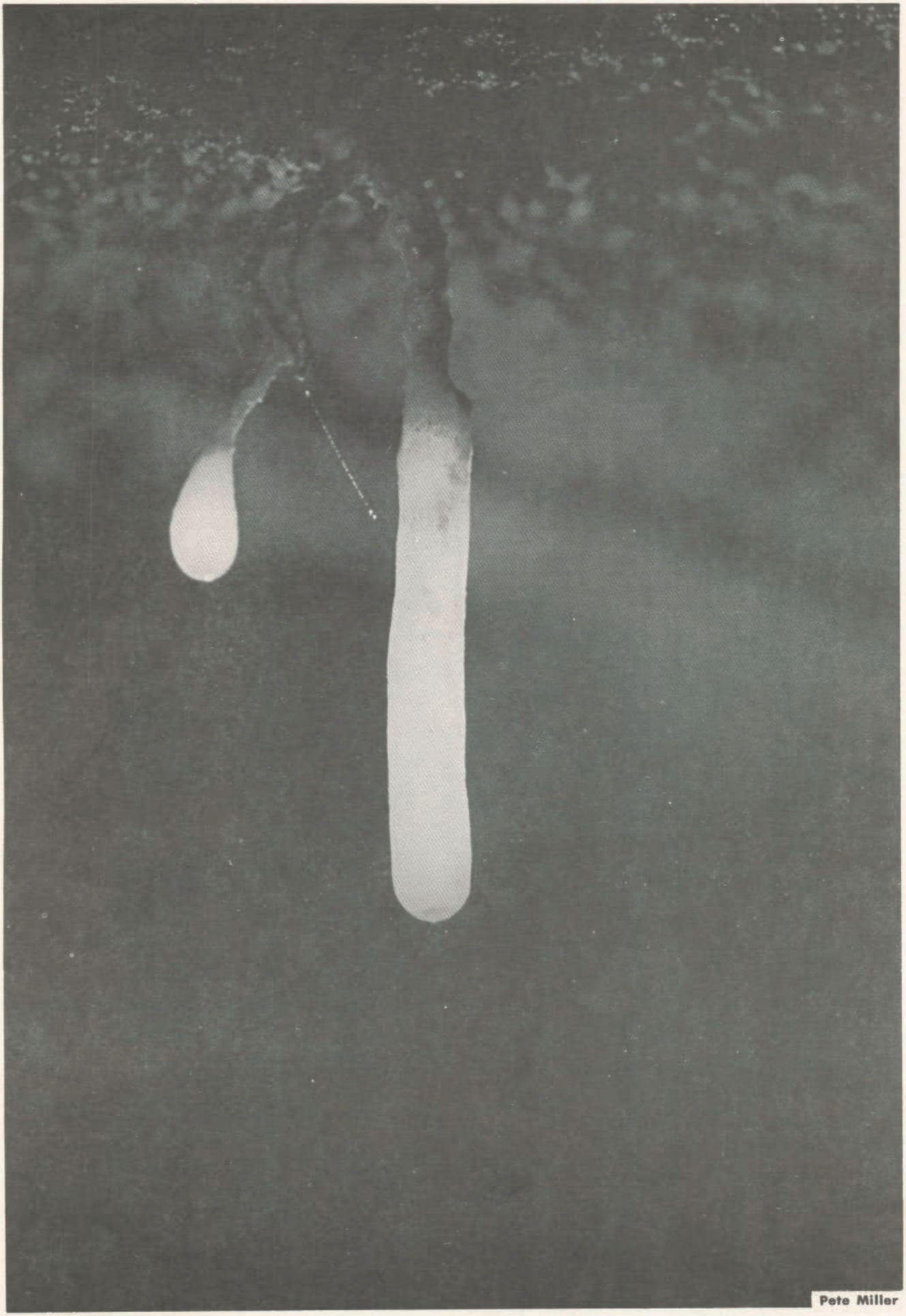
When the going gets tough, the tough get going!

Breakdown Broth Recipe

By Tim Kettering

Breakdown is abundant in Rockcastle County. It can be gathered year 'round, in just about any cave. One should gather enough breakdown for a large, large kettle. Remember cavers have been known to eat a lot. The breakdown should be simmered for about one hour, seasoned to taste with salt, petre and it's ready to eat. Mm, Mm, it'll bring them out of the ground every time.

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Lonely droplets fall from these delicate formations at Helectite Heights in the Goochland System.

www.andyniekamp.com

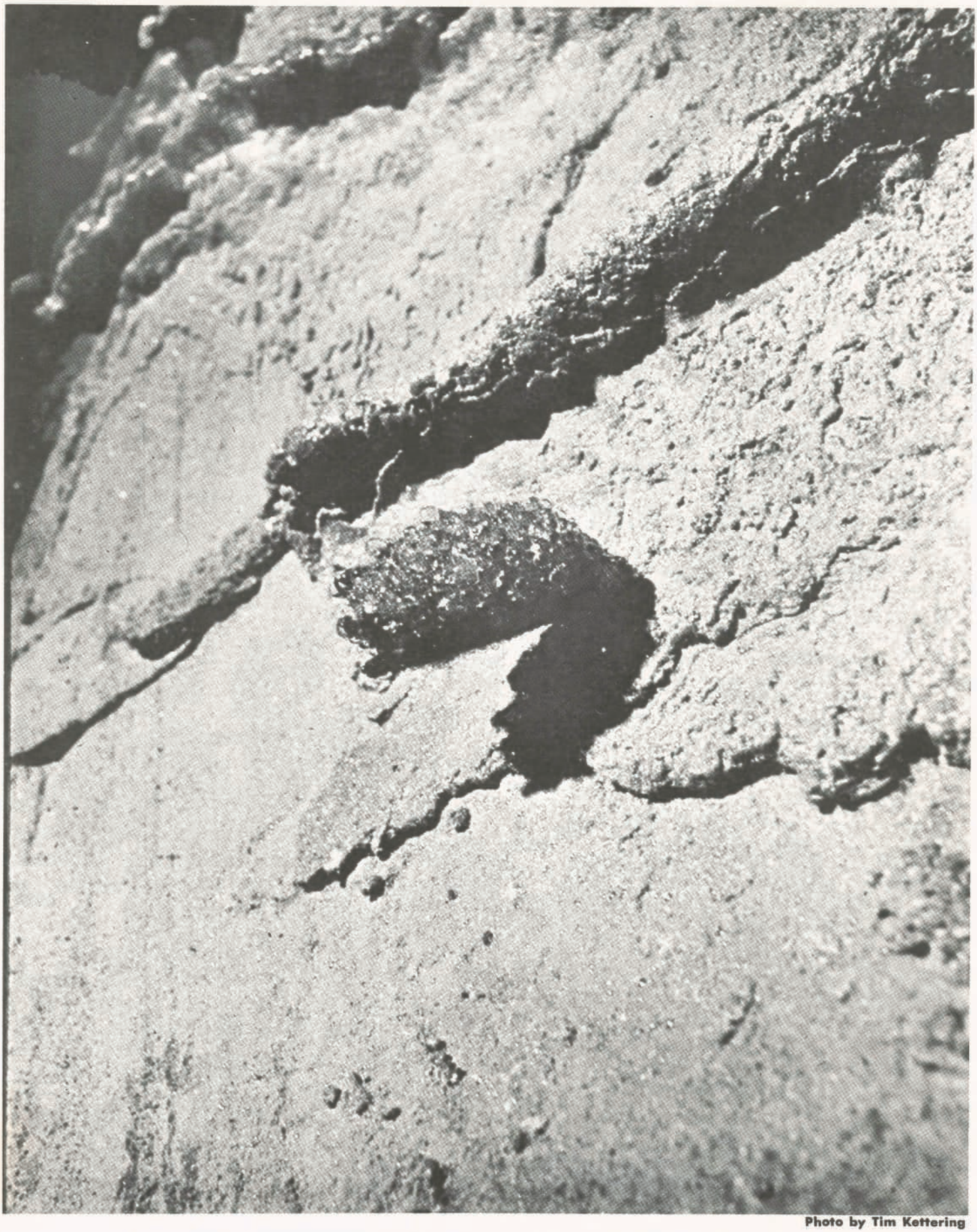


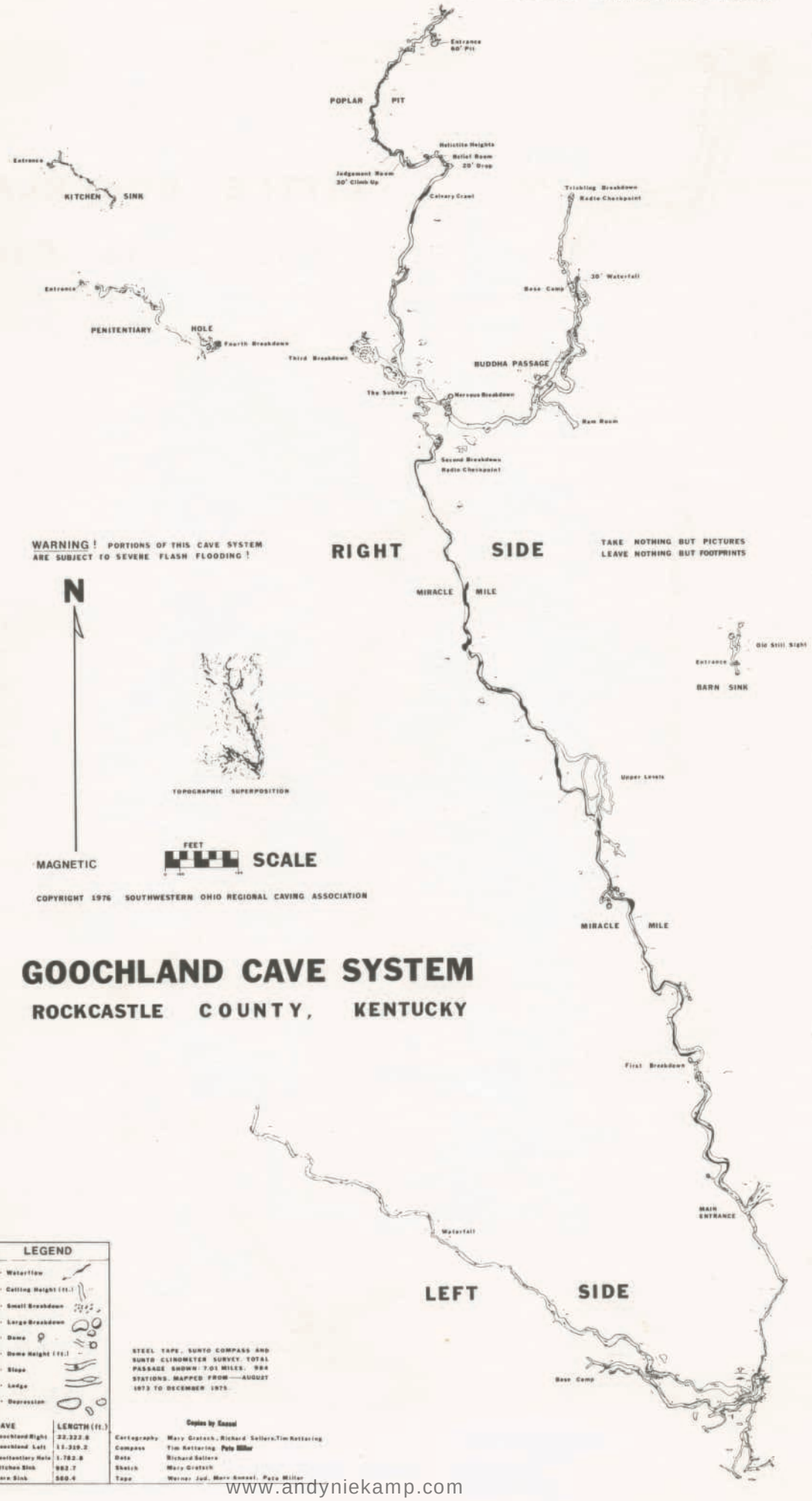
Photo by Tim Kettering

MOISTURE LADEN BAT

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ACKNOWLEDGEMENTS:

CAVEPLOT CAVES OF ROCKCASTLE COUNTY KENTUCKY



GOOCHLAND CAVE SYSTEM

ROCKCASTLE COUNTY, KENTUCKY

LEGEND

- Waterflow
- Ceiling Height (ft.)
- Small Breakdown
- Large Breakdown
- Dome
- Dome Height (ft.)
- Slope
- Ledge
- Depression

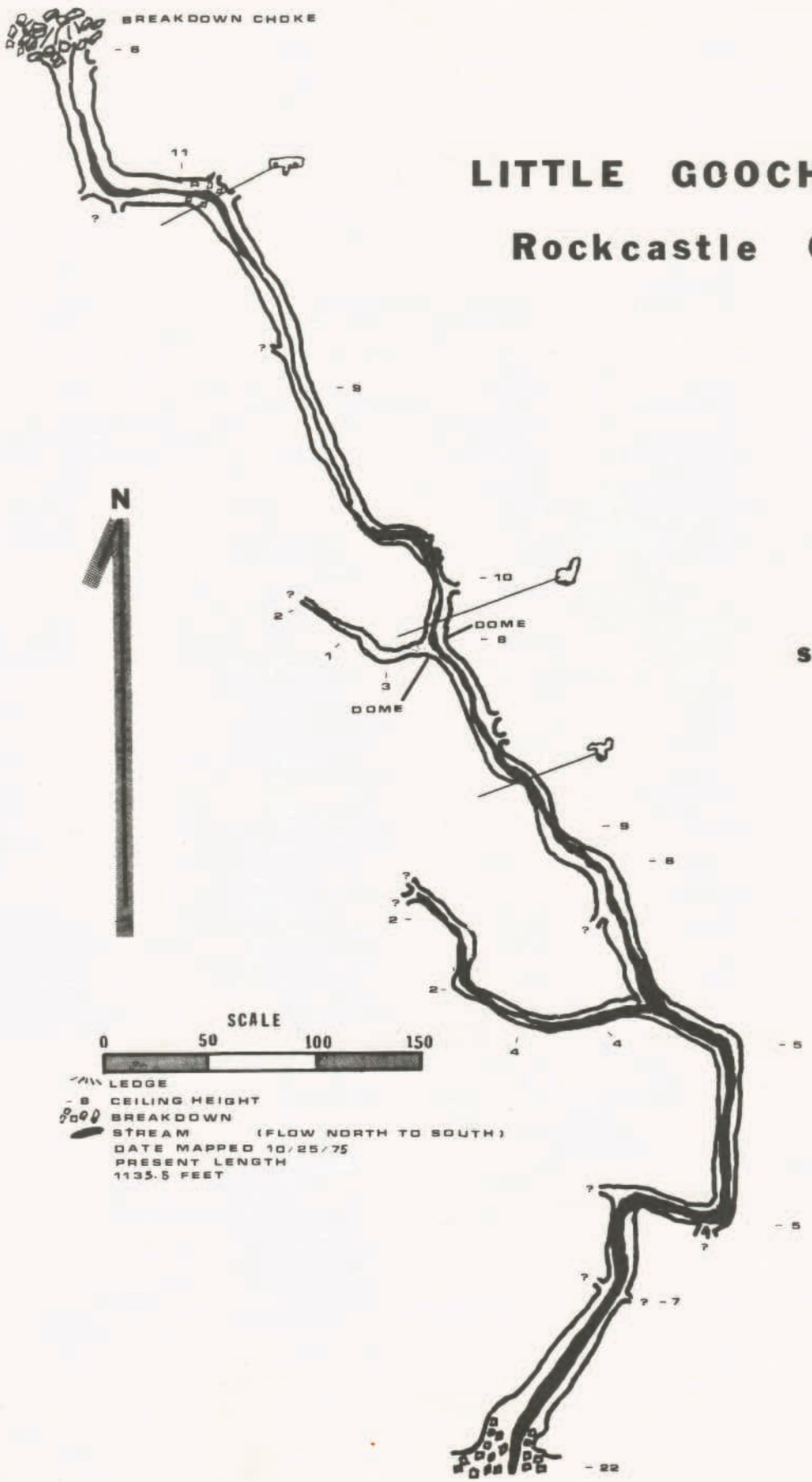
CAVE	LENGTH (ft.)
Goochland Right	22,322.8
Goochland Left	15,319.2
Penitentiary Hole	1,782.8
Kitchen Sink	982.7
Barn Sink	580.4

STEEL TAPE, SUNTO COMPASS AND SUNTO CLINOMETER SURVEY. TOTAL PASSAGE SHOWN: 7.01 MILES. 984 STATIONS. MAPPED FROM——AUGUST 1973 TO DECEMBER 1975.

Copies by Exonet

Cartography	Mary Gretsch, Richard Sellers, Tim Kettering
Compass	Tim Kettering, Pete Miller
Data	Richard Sellers
Sketch	Mary Gretsch
Tape	Warner Jud, Merv Kennel, Pete Miller

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LITTLE GOOCHLAND

Rockcastle County

survey team

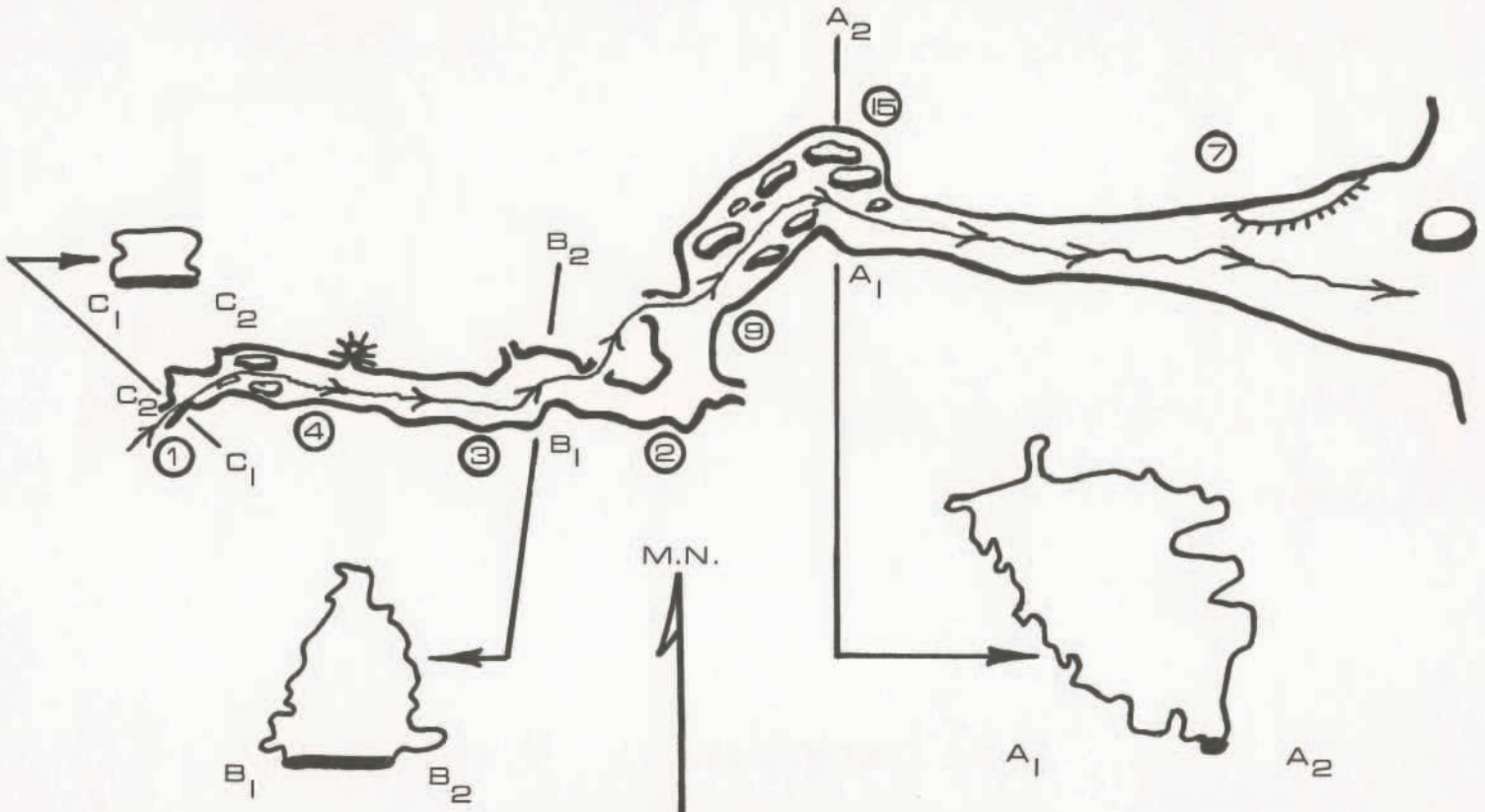
Mary Gratsch
Werner Jud
Tim Kettering
John Miller
Pete Miller
Richard Sellers

Copies by Knasel

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ANGLIN FORK CAVE

ROCKCASTLE COUNTY KY.



MAPPED 11/9/75 BY

M. GRATSCH - R. SELLERS

STANDARD SYMBOLS USED

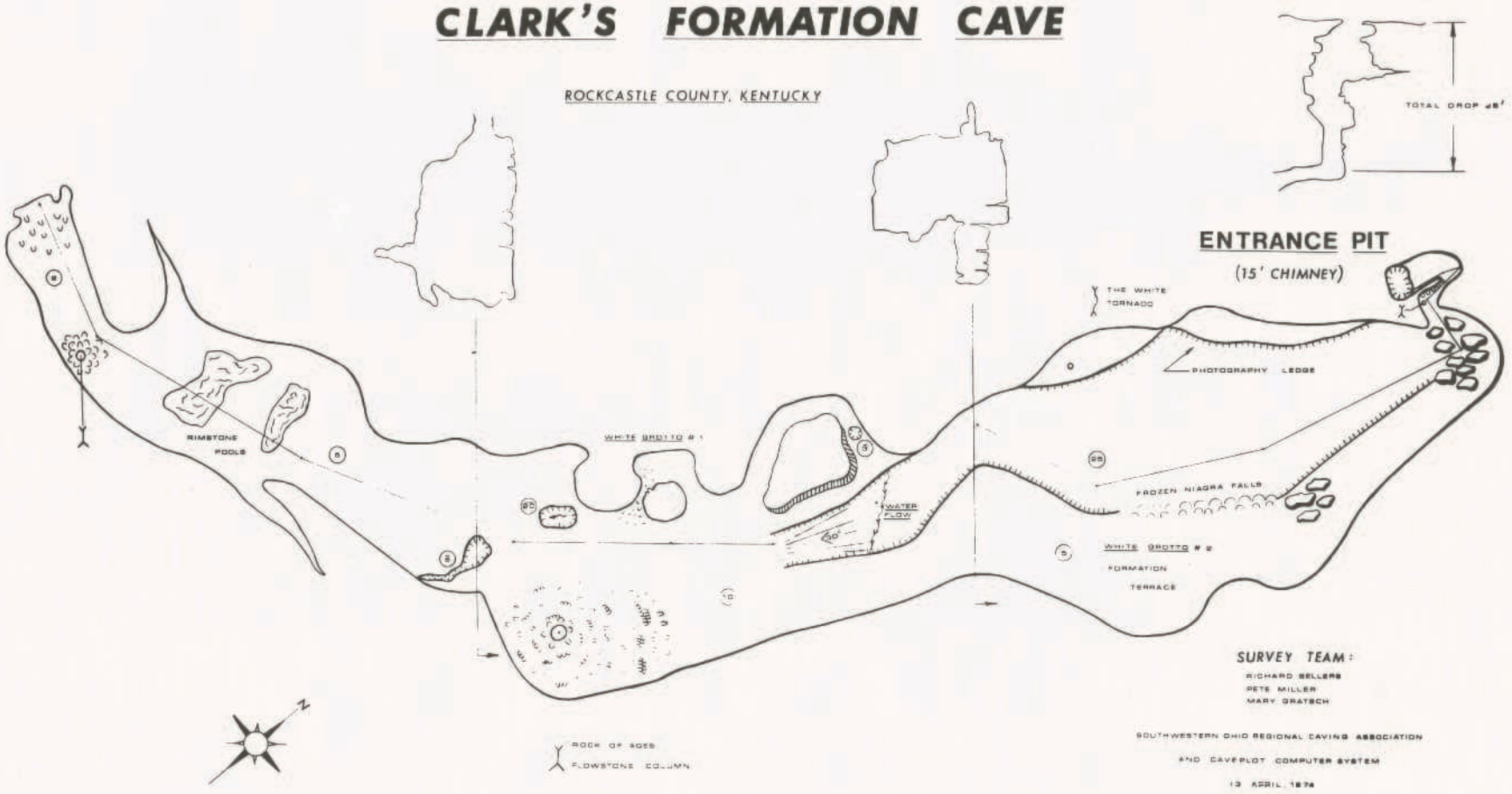
SOUTHWESTERN OHIO REGIONAL

CAVING ASSOCIATION

www.andyniekamp.com

CLARK'S FORMATION CAVE

ROCKCASTLE COUNTY, KENTUCKY



SURVEY TEAM:

RICHARD SELLERS
PETE MILLER
MARY GRATSCH

SOUTHWESTERN OHIO REGIONAL CAVING ASSOCIATION

AND CAVEPLOT COMPUTER SYSTEM

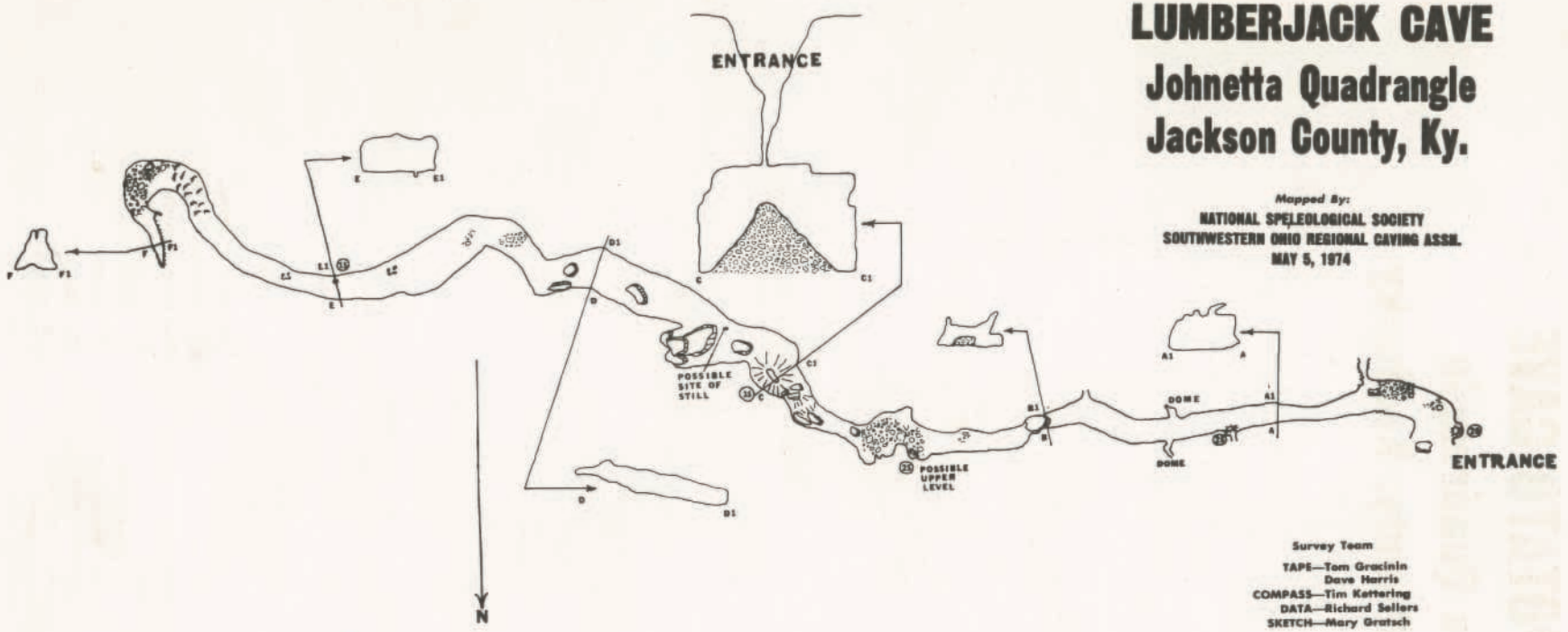
13 APRIL, 1974

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LUMBERJACK CAVE

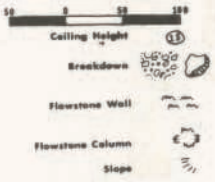
Johnetta Quadrangle
Jackson County, Ky.

Mapped By:
NATIONAL SPELEOLOGICAL SOCIETY
SOUTHWESTERN OHIO REGIONAL CAVING ASSN.
MAY 5, 1974



Survey Team
TAPE—Tom Gracinin
Dave Harris
COMPASS—Tim Kettering
DATA—Richard Sellers
SKETCH—Mary Gratsch

SCALE

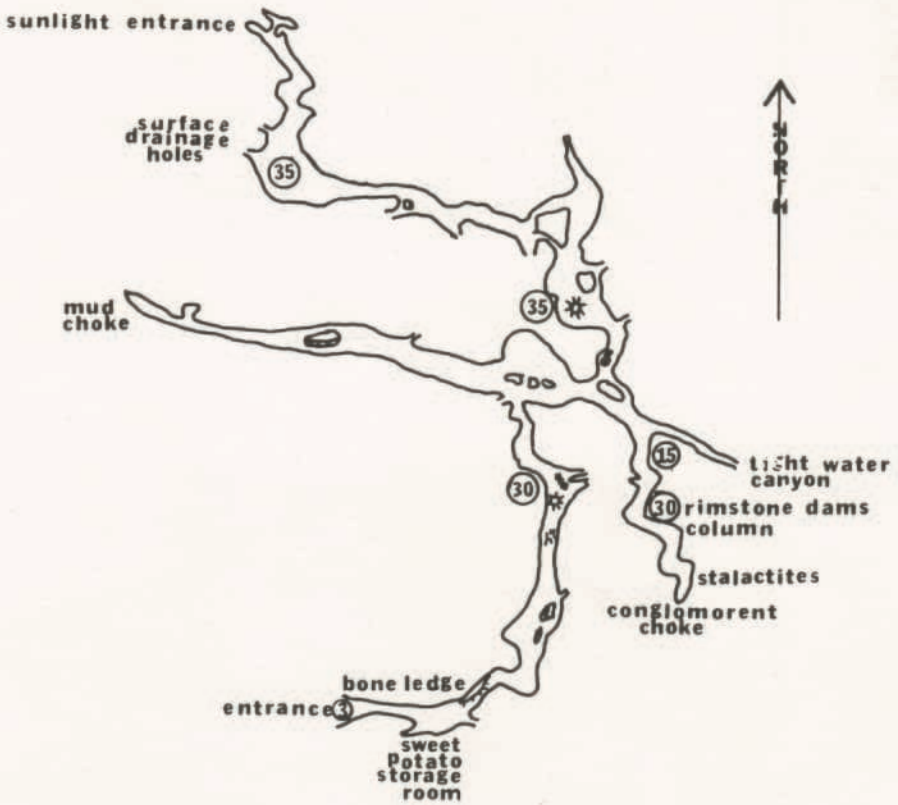


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SWEETPOTATO CAVE

Johnetta Quadrangle

Rockcastle County, Kentucky



Mapped by Members of the National Speleological Society
Southwestern Ohio Regional Caving Association

Date July 14, 1974
Present Length 935 Feet

Survey Team

Tape. . . . . Dave Kelly
Compass. . . . . Tim Kettering
Data. . . . . Richard Sellers
Sketch. . . . . Mary Gratsch

Map Copies By Marv Knasel

SCALE

25 0 25 50

69 Ceiling Height

Breakdown

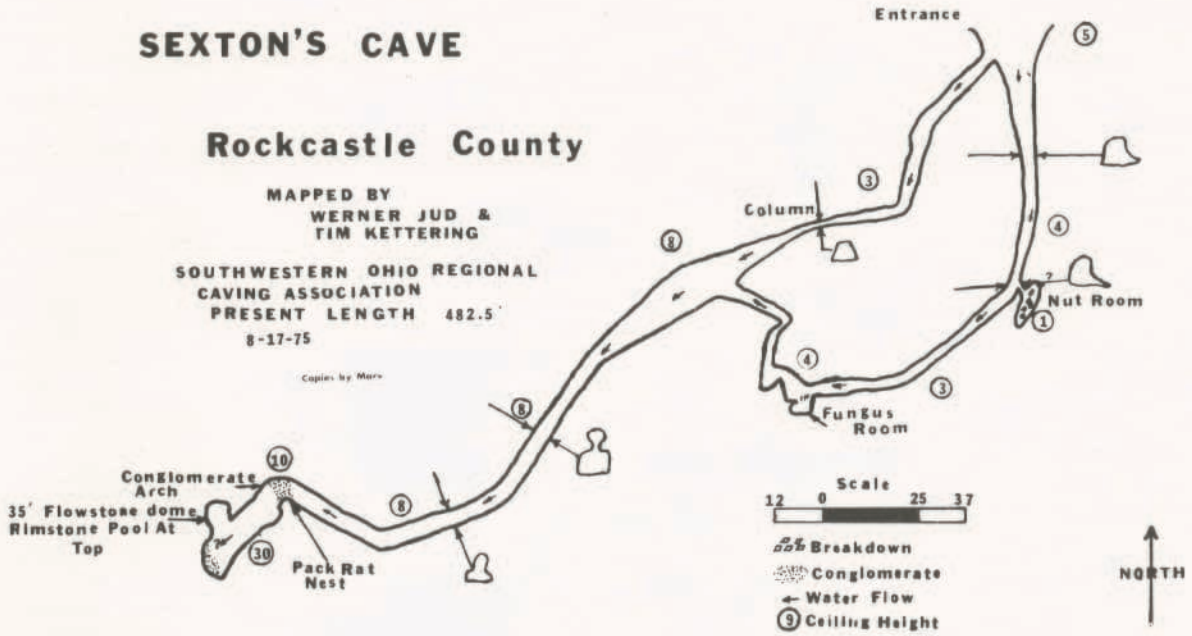
Ledge

Dome

9 Drop

Slope

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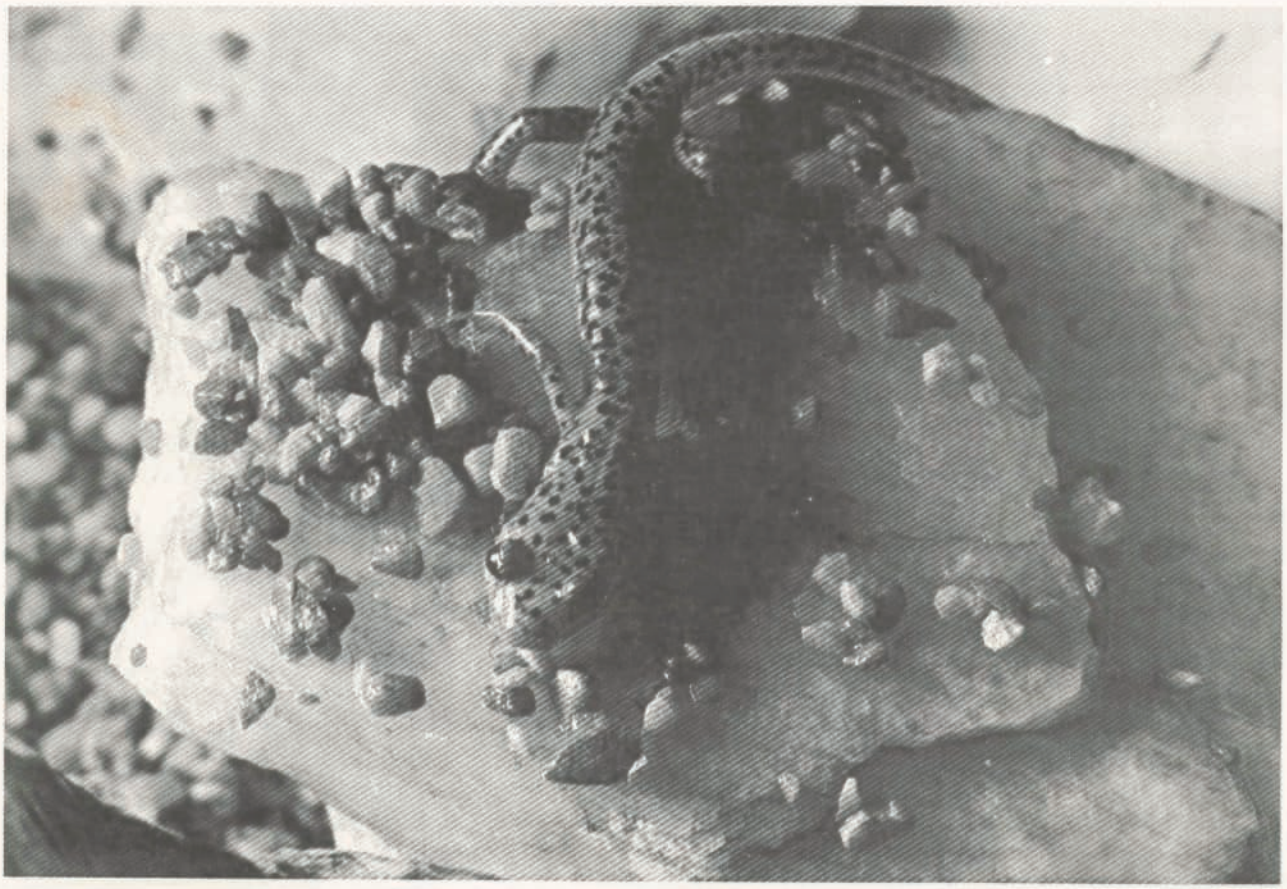


Photo by Pete Miller

CAVE SALAMANDER POSES PATIENTLY

www.andyniekamp.com

LAMP FACTORY—Emphasis On The Right Equipment

It is the belief of SWORCA that the caver's single most important piece of equipment is his or her lighting system. It is also one of the most controversial. For maximum efficiency of any caving team, specialized lighting systems are imperative.

The carbide lamp, commonly accepted as the best caving light is a partially effective, primitive relic of the past, as compared to a modern, prescision, cave-engineered electric cap lamp system. I'm not talking about some cheap method like a six-volt zinc/carbon battery available in most department stores. It's systems like that which have made electrics notorious to some carbiders. In fact, no where is there a cap lamp system of high enough quality with the specifications that serious caving demands.

Because a man is no better than his tools and a caver is no better than his light, Tim Kettering and I decided to do a little research to find some kind of cave-lighting system to set the record straight. After a great deal of field testing and experimenting, we have built some rechargeable systems that have worked and worked well year after year on hundreds of cave trips.

We wanted to show the caving community just what we have discovered. This is all summarized by our Lamp Factory Catalog in a reduced size herewith.

THE LAMP FACTORY

REVOLUTIONARY NEW

ELECTRIC CAVING EQUIPMENT

GREETINGS .....

May We Give An Important Note of Introduction:

The Lamp Factory is an organization of conservation-minded cavers trying to serve you, our fellow cavers. For years we have used and tested electric caving gear. We have made a science out of electric caving and have developed what we feel are the finest electric caving lights anywhere! We have designed our batteries to be lightweight and to contour to your body so well that they practically go unnoticed.

All of our GOVERNMENT SURPLUS NICKEL-CADMIUM CELLS are hand-picked Sonotones, the cream of the crop, and should last indefinitely. With care they may last a lifetime of caving. The original government cost of each cell is $20.00 or $80.00 per battery. We put them in our fantastic new Lexan or Stainless Steel Cases and sell them to you at a fraction of this cost! For safety, all systems contain a special waterproof circuit breaker. If for any reason you should need any spare parts, they are available on request.

Our systems are designed for the serious caver and the professional. When your life depends on reliable light sources, they're worth the price. Our MSA Lead-Acid System will give UP TO 50 HOURS OF CONTINUOUS POLLUTION-FREE LIGHT PER CHARGE! No spare carbide, no repair kits, just an incredibly reliable system!

The average carbide light produces about 3 MSCP (Mean Spherical Candle Power). All our our systems will provide considerably more! Our new and unique "2000 Watt" Photo Superlight not only is great for movies and stills, but really shows what the cave looks like! For the first time you will see the natural color and beauty that only 2000 Watts could provide!

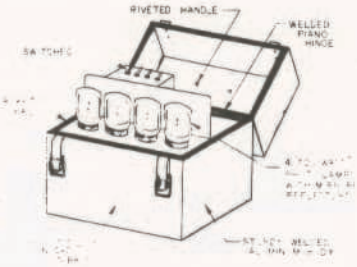
Please remember that actual weights of items are less than shipping weights. So here are the facts. You decide what system is best suited for you. If you have any questions or suggestions, please let us know. We wish you the best in your caving endeavors.

Speleotations,

Rich Sellers
13184

Tim Kettering
12953

This is the same catalog as advertised in several back issues of NSS NEWS.



"2000 WATT" PHOTO SUPERLIGHT

In one neat little aluminum case! Lights up big rooms like daylight! Both high beams of your car won't hold a candle to this! It's really, really bright! Great for movies and stills. Use your electric eye. Eliminates much of the guesswork involved in cave photography. See what you're taking while you're taking the picture. Balanced at 3,200°K. Water, mud and shock-resistant. Powered by 18 rechargeable nickel cadmium government surplus cells. One bulb burns 40 minutes per charge, all four burn about 8 minutes per charge. Plenty of time to shoot a roll of 36-exposure film. Charger included! Dimensions: 6½"x10"x10". You haven't seen a cave until you see it under "2,000 watts" of superlight!

Shipping Weight, 18 Lbs.
Stock Number 101 $189.00

*400 watts actual power with special mirrored internal reflectors is as bright as 1,000 watts with external reflectors in standard optical systems.

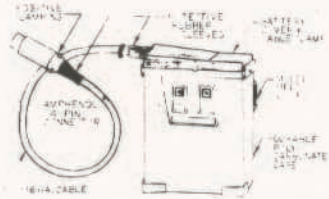
To conclude this article on electric caving lights, Lamp Factory never intended to make a profit. And since it is interfering with our caving, we will not

PROFESSIONAL QUALITY MSA

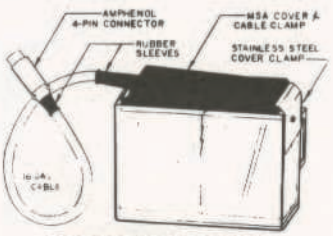
MINER'S BATTERIES

BRAND NEW! Originally designed for an 8-hour working day per charge at 4 volts, 13-amp hours. Now at last we have adapted this commercially manufactured battery especially for caving. With a higher efficiency bulb, this system gives UP TO 50 HOURS OF BRIGHT POLLUTION-FREE LIGHT PER CHARGE! Automatically vented. Durable poly-carbonate case ... all are sealed, unbreakable unit. Rechargeable thousands of times. Life expectancy at least 5 to 6 years. Bright orange floats accurately display electrolyte level. With 16-ga. cable, special 4-pin, quick-disconnect plug, water filler with needle tube, and welded circuit breaker. For use with our specially altered Justrite Cap Lamps (stock number 103). AN INCREDIBLY RELIABLE SYSTEM! Dimensions: 11½"x5"x7½". Please specify your height, so we may custom fit our cable length to you. (Otherwise we will use our standard length cable).

Shipping Weight, 8 Lbs.
Stock Number 102 $36.00



give out any more free time and effort to our customers. Instead we will include a few articles on how to obtain parts and build your own systems.



HIGH IMPACT CLEAR PLASTIC NICKEL-CADMIUM BATTERY PACKS! Made of Unbreakable "Lexan®"

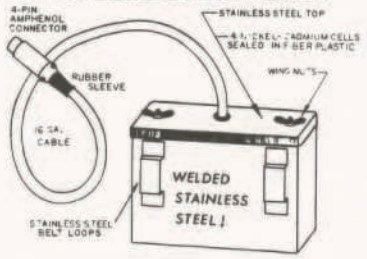
The material used to protect the Astronauts in space

This battery pack is made of amazing new General Electric "LEXAN" which was used on the clear faceplates of the Astronauts' space suits during recent Apollo lunar missions. We have completely sealed 4 rechargeable government surplus Nickel-Cadmium cells in a durable acrylic resin and covered all this with our tough lightweight "LEXAN" case. WHAT A BATTERY! NOTHING ELSE LIKE IT ANYWHERE! Rechargeable thousands of times. Unlimited life-expectancy! With tight seal screw vents it may be completely submerged. When it gets dirty, just wash it off under a faucet. 6-7 amp hrs. at 5 volts. Roughly 3"x5"x6". Will provide 10-14 hours of bright light per charge with a #425 bulb or up to 22 hours of continuous light per charge with a #27 low-current bulb at slightly less brightness. Complete with waterproof circuit breaker for safety, heavy-duty 16-ga. cable, belt loops, and 4-pin Amphenol connector (3 pins per wire) for reliability.

Shipping Weight 5 Lbs.
Stock No. 117 $29.00

They are well worth the effort and without them you will not be as expert. Carbide can't comptete, performance-wise, with these systems, and yet a very, very select few have become aware of how much better the right kind of electric system can function.

STAINLESS STEEL CLAD!



All stainless steel, top to bottom! Our own custom-built welded case. Inside are four rechargeable Nickel-Cadmium Government Surplus cells completely sealed in durable fiber plastic. (Polyester resin with fiberglass reinforcement. This battery is really built to take the worst abuse any caver can dish out. 100% waterproof—just wash it off under a faucet! This is our optimum battery with respect to physical durability and the almost unlimited life-expectancy of nickel-cadmium cells. If properly cared for it should last a lifetime of caving. 6-7 AMP hours at 5 volts. 12-14 hours of bright light with a #425 bulb or up to 22 Hours of light per charge with a #27 bulb (Less Brightness). 7"x5"x6".

Shipping Weight 6 Lbs.
Stock Number 118 $36.00

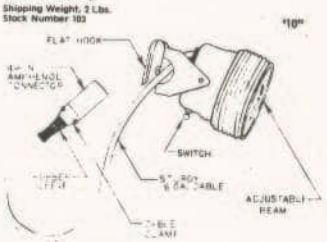
You won't need to worry about spare carbide, water bottles, tip reamers, felts, repair kits, spent carbide bags and all of the frequent attention and refillings inside the cave.

SPECIALLY ALTERED!

JUSTRITE CAP LAMP

For use with all our battery systems. Swivel-mounted headlamp assembly with switch, adjustable beam, miniature screw-base bulb socket, specially altered 16-ga. cable and Amphenol quick-release connector. Connector uses 4 pins, 2 per each wire connection for reliability. Complete with flat hook and elastic strap for greater stability.

Shipping Weight, 2 Lbs.
Stock Number 103 $10.00



SPARE PLUGS

Male (Cap Lamp or Charger End) $.40 Postage Paid — Stock No. 119
Female (Battery End) $.40 Postage Paid — Stock No. 120

UNALTERED CAP LAMPS

All the quality features of our specially altered cap lamps but with standard 18-ga. cable and eyelets. For use with any 6-volt lantern battery available in your area.

Stock No. 105
Shipping Weight 7 Lbs. $5.00

If you are a serious, conservation-minded caver, don't kid around with anything else but a good electric system.

OUR OWN SPECIAL CHARGERS

CHARGER FOR MSA MINER'S BATTERY

115-125 Volts AC. Complete instructions included for proper charging time.
Shipping Weight, 3 Lbs.
Stock Number 112 $8.00

CHARGER FOR NI-CAD BATTERIES

115-125 Volts AC. Complete instructions included for proper charging time.
Shipping Weight, 3 Lbs.
Stock Number 113 $8.00

SPECIAL MOBILE CHARGERS

To be used with either Miner's Batteries or Ni-Cads Batteries. Powered by the 12-volt cigarette lighter in your car. Just plug them in and charge overnight. WILL NOT SIGNIFICANTLY DRAIN CAR BATTERY. Great for those long cave trips away from electricity!
Shipping Weight, 2 Lbs.
Stock Number 114 $8.00

•1"x" Web Belts For Battery Systems.
No Shipping Weight (Postage Paid)
Stock Number 115 $1.00

BUILD YOUR OWN BATTERY CASE AND SAVE!

•Individual Nickel Cadmium Government Surplus Cells. (Originally cost government '20-cell' 1.25 Volts at 6-7 Amp Hours. 4⅝"x2⅝"x¾".
No Shipping Weight (Postage Paid)
Stock Number 116 $4.00/cell

www.andyniekamp.com

Technical Report:
A Summary of Operating Parameters for Electric Caving Lights

By Richard Sellers

No battery is small enough, lightweight enough, inexpensive enough, and with enough watt-hour capacity to be mounted on a hard hat. This necessitates the use of a belt-mounted battery and a cable extending to a cap-mounted lamp.

Bill Varnedo from Huntsville, Alabanma is a man with whom I have conversed quite a bit on this subject and is probably one of "the" authorities on electric caving. In his treatise on electric lights in the NSS Bulletin Volume 32 number 4, he stated that "Selection of a portable electric light for cave exploration involves an enormous number of interrelated parameters that make trade-off studies very complex."

I agree with Bill and suggest you read his article. I will limit myself more than he did in his work.

Choosing the proper system means putting the proper miniature lamp with the proper battery. The correct combination depends entirely on the caving conditions.

Lamps

The starting place is miniature lamps. A catalog such as the Chicago Miniature Lamp Catalog #CMD-3 gives design specs for all lamps including design voltage, current, brightness, and life expectancy of the filament. For maximum efficiency use the right bulb; never use a resistor or transistor to vary the light output. The right bulb will have the proper effieciency; not too high or low. An efficient system means one that gives a high ratio of light energy to total energy dissapipated in the bulb, but too high a voltage across the bulb will raise the filament temperature causing quick burnout.

To rerate lamps away from the catalog operating point, experimentation shows the following three relations:

$$B_R = \left(\frac{V}{V_D}\right)^{3.5} \times B_D$$

$$L_R = \left(\frac{V_D}{V}\right)^{12} \times L_D$$

$$C_R = \left(\frac{V}{V_D}\right)^{.55} \times C_D$$

L_R—Rerated Life (Hrs.)

L_D—Design Life (Hrs.)

V_D—Design Voltage

V—Application Voltage

B_R—Rerated Brightness (Means Spherical Candle Power)

B_D—Design Brightness (Means Spherical Candle Power)

C_R—Rerated Current

C_D—Design Current

The graph of life, current and brightness is summarized in figure 1.

Batteries

All batteries are either primary (non-rechargeable) or secondary (rechargeable). Primary batteries are used commonly in flashlights. One example is a zinc-carbon battery; this is the most expensive way to go caving. Rechargeable batteries are far cheaper in the long run and are worth the extra initial cost.

Lamp Factory has chosen perhaps two of the best of many types of secondary batteries and placed them in custombuilt, shockproof; waterproof cases. These cases then provide the necessary stress-relief to a special cable and 4-pin locking in-line plug and then to a specially altered Justrite Cap Lamp.

These two types are Nickel Cadmium and Lead-Acid wet cells. Each are capable of producing perhaps 100 amperes under dead short conditions and can heat up a cable red hot (like a toaster wire) around your body. For this reason all cells of this type should be protected.

We use a special waterproof, self-reseting circuit breaker. Many other types are mentioned in the article by Varnedo, but Lamp Factory limits itself to these two batteries, one or the other of which will serve well for most any caving conditions.

The brightness of any miniature lamp is a function of voltage and hence a Voltage vs. Time Curve (fig. 2) gives a good summary of the caving performance of Nickel Cadmium, Lead Acid and ordinary flashlight Zinc-Carbon Cells. Here Nickel Cadmium gives a constant discharge rate, but may leave you "in the dark" without much warning as you approach the end of the cycle. At miniature lamp currents of about .5 amp this "black-out" will occur in 20 minutes to a half hour after a decrease in brightness is first noticed. Lead Acid gives a much safer curve as it decreases more gradually.

This tells then, very briefly, a few basics about bulbs and batteries. The reason for using Nickel Cadmium and Lead Acid cells is not just their electrical characteristics, but the fact that these are easily available and lend themselves well to caving. They are also inexpensive if you go to the right places. Again, if your life depends on reliable light, cost is unimportant.

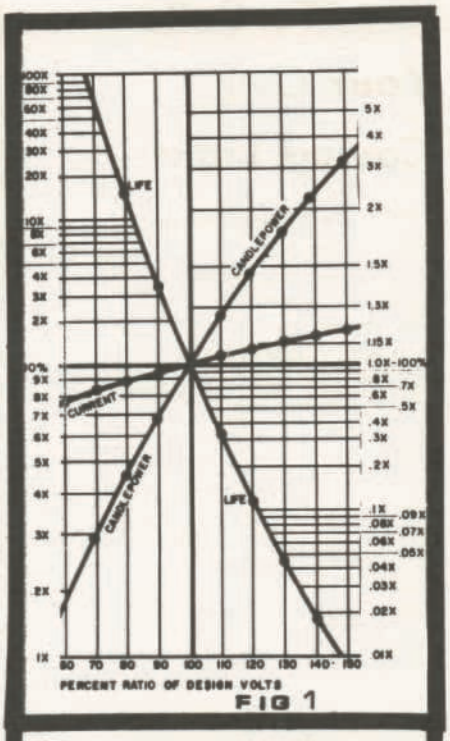
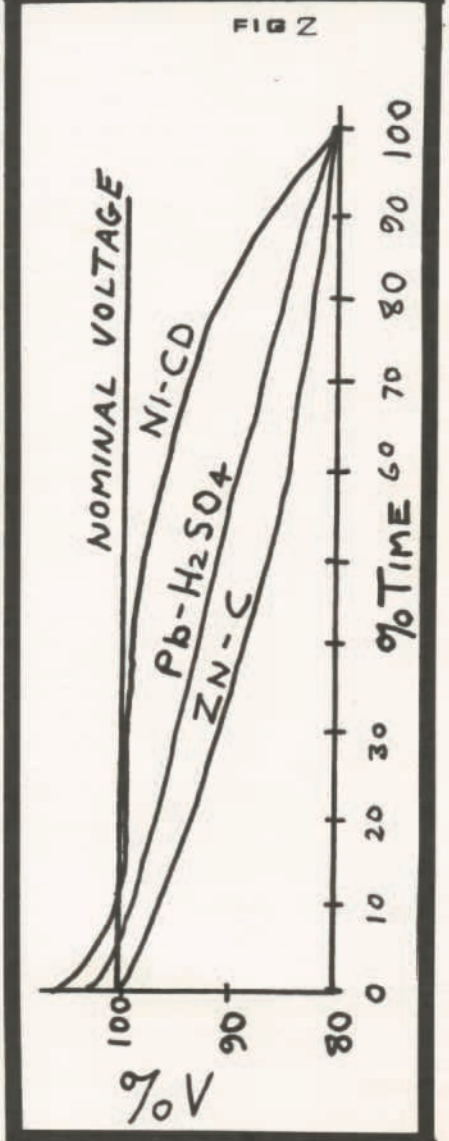


FIG 1

FIG 2



When the going gets tough, the tough get going!

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How To Build Your Own Caving Lights

By Richard Sellers

If you are rather confident in your ability in electric wiring, here are a few trade secrets that will net you some top quality caving lamps. These are a short summary of methods we used and will give a general description only. You must work out the details yourself.

(1). Minespot Commercial Lead Acid Battery. This system provides up to 50 hours of light per charge. Optimum battery for long trips., automatically vented, unbreakable polycarbonate case. Purchased from Mine Safety Appliances Company, 400 Penn Center Blvd., Pittsburgh, Pa. 15235.

Order Part Numbers As Follows:

Quant.	Part No.	Name
1	96404	Battery Assembly with Acid
1	96234	Battery Cover Assembly
1	89909	Cable Protector
2	96219	Cover Clamps
2	69208	Screws
2	454053	Pole Clamps
2	65522	Screws
2	96202	Cable Retainer Washer
2	65545	Screws
1	96422	Single Battery Filler Bottle

Use 16-2 machine tool cord; the type used on electric drills. (Available in most hardware or department stores) The best type of wire has a black plastic outer cover coating and two 16-ga. color-coded, plastic covered, non-shellacked stranded wires inside. A 4-pin amphenol, cannon XLR, or Swith--craft audio connector works well inline near your hard hat (about shirt collar height), although if you have a way to remove the Cap Lamp and cable restraint from you hard hat, a plug is not needed. Always wear the cord inside your coveralls.

Purchase the Cap Lamp from Justrite Mfg., Chicago, Ill. or a local distributor. You will need to remove the small cord and drill out the gromet to allow rewiring with 16-ga. cord and a larger rubber gromet. Use a #41 bulb for most caving and a #13 for 50-hr. extended trips.

If you prefer, you can buy an 8-hr. per charge system from MSA prewired, but few cavers will accept this short time span per charge.

(2) Ni-Cad Batteries.

These are rugged, completely waterproof, never deteriorate and with proper care should last a lifetime of caving. Purchase from ESSE Surplus Co., 368 S. Meridian St., Indianapolis, Ind. 46225. One system would be to place four small cells in a series-wired rectangular array. Then place them in a box made of stainless steel (a sheet metal shop can help you there) Then fill the box with fiberglass and polyester casting resin covering all connectors to eliminate corrosion. You will need to open the vents to charge, however. Don't get resin in them!

Another method is to make a box of General Electric's "LEXAN" and use a special acrylic resin PS30 made by Dayco and sold through Cadillac Plastic Co. Use an MSA waterproof circuit breaker and Justrite Cap Lamp mentioned. Use a #425 bulb for most caving and #27 bulb for 22-24-hr. extended trips.

Little Blue Scout

This poem is dedicated to all four-wheel drive cavers and especially the Editor of the SWORCA Digest 1975 who has a little blue Scout.

This is the story of a little blue Scout,
that thought it could just keep mov'in on out.
Come on Y'all, I'll take you a ride,
a ride quaranteed to tear your hide.

Over the shoulder and down on the boulders,
in four-wheel drive,
it felt like sit'in on a bee hive.

Bounce'in and rock'in, it kept move'in on,
and then with a shudder,
it leaped in a mud puddle...

Like a proud mother,
he felt better than all others,
but then son of a buck,
he was stuck in the muck.

Tear down that outhouse; boards under wheels,
spin'in and spin'in, still ain't gettin' no where.

Four hours later, and a lot of time,
that mother ain't moved as far as a dime.

We said the four-wheel rear ain't gon'a move,
but he kept push'in its peddle,
and the Scout would just settle;
(deeper and deeper into the slime of time).

The day's light was gone,
but he sang his own song.

Slip'in and slid'in, little progress he make,
but then son of a buck,
that mother was almost out of the muck.

Tore off a bumper, and dented a door,
just another part of his private horror.

Horror or not, soon free he got ...

Cold front was through, and snow soon fell,
so he drove that Scout like a bat out of hell.

Close call or two, we survived,
and then, son of a buck,
we were back at the SWORCA speleo hut.

by David Sligar



SWORCA Meets the First Thursday of the Month, Why Not Join Us for a First Rate Meeting and Slide Show.

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Instructions for Rechargeable Nickel Cadmium Battery

BY DAVID SLIGAR

A GENERAL DESCRIPTION: Your Nickel Cadmium battery consists of four series-wired 1.25 volt, 6 amp/hour NiCd cells to produce the 5 volt, 6 amp/hour battery. Each cell has its own screw vent allowing access to the electrolyte, which is a caustic (alkali) Potassium Hydroxide (KOH) and distilled water solution. Positive (+) and Negative (-) output terminals are as marked. The cells are sealed in a clear (fiberglass reinforced) polyester resin which is in turn clad in a strong welded stainless steel case with belt loops and lid. The lid provides stress relief for the power cord going to your head lamp. The battery is waterproof and may be washed off under a faucet when the four cell access vents are screwed down firmly. For your safety, a self-resetting circuit breaker is built into the battery. The battery will provide about 12 hours bright light with a 5 volt, ½ amp bulb such as a #425, and up to 22 hours light (less brightness) with a 5 volt, .3 amp bulb such as a #27. Over 30 hours light may be obtained by using a somewhatdim bulb such as a .15 amp #502 bulb. Your NiCd battery, if properly cared for, has a theoretically unlimited life.

Charging Instructions—Also Care and Safety

1. Warning—Always open the four screw vents (found under the stainless steel lid) which provides access to the cells electrolyte fluid before charging. FAILURE TO DO SO MAY RESULT IN A HARMFUL PRESSURE BUILD UP DURING CHARGING.

2. Normally this small release of pressure will be manifested by a slight hissing, however, a hazardous spurting or spitting of the caustic electrolyte solution may occur if the screw vents are not opened slowly to releave any pressure. The screw vents have a safety pressure valve incorporated in them.

3. During charging, (especially when cells are nearly completely charged) a degasing or decomposition of the water in the electrolyte solution into its elemental components of hydrogen and oxygen will occur. This degasing can be detected by a bubbling sound. Because of this degasing, small quantities of distilled water must be periodically added through the screw vents to maintain the electrolyte level in the four individual cells. The electrolyte level is NOT extremely critical. Cells will function as long as the plates are wet. Distilled water added too often or in too large amounts will cause electrolyte to bubble out during charging.

4. Contamination is your NiCd battery's worst enemy. If you want your battery to last many, many years—NEVER add any water but DISTILLED water. Bottled distilled water is available at grocery stores. DO NOT buy or use bottled well, spring, or tap water. It is the dissolved mineral content found in non -distilled waters that make them harmful to your battery. NEVER GET ACIDS NEAR OR INTO YOUR NiCd BATTERY, AS IT IS AN ALKALINE BASED BATTERY AND WOULD BE DESTROYED BY ACIDS.

5. Safety—The electrolyte is a 30% solution, by weight, of Potassium Hydroxide (KOH) in distilled water. This is a strong caustic or alkaline solution capable of causing severe burns (progressive type). If any electrolyte gets on the skin, wash it off. If any gets in the eyes, rinse eyes under running water for 20 minutes—Call Physician.

6. If the electrolyte is ever accidently dumped, it may be replaced by the formula above in #5, but this is a hazardous job.

7. Electrical hook-up to a special Lamp Factory charger is extremely simple because of the pre-polorized plugs. Unplug battery from head lamp, open screw vents leaving them in place but tilted, plug battery into charger, plug charger into 120 VAC household outlet for 16 hours. (Charging time based on completely dead battery). Bubbling in cells should be heard as charging becomes complete. Over-Charging will NOT harm battery. After unplugging charger, let battery sit for 10-15 minutes for bubbling to cease before sealing the screw vents. Note that plugs on battery/head lamp/charger are notched and may only be inserted into each other one way, also, note push button for release. To avoid possible damage from heat or chemicals, we recommend battery charging take place on a concrete floor.

8. Any auto battery charger (up to 3 amperes) which is capable of charging 6 volt batteries may be used to charge your stainless steel cased NiCd storage battery. Procedure: (1) Remove stainless steel lid. (2) Unscrew electrical terminals (red +, black -) and remove headlamp wires. (3) Open the four cell screw vents. (4) Connect charger to battery so that the (+) positive charger wire is connected to the (+) positive battery terminal, and the (-) negative charger wire is connected to the (-) negative battery terminal. What charging does is to force electricity backwards through the battery from the way electricity flows in a battery when discharging, thus reversing the battery's chemical process. (5) Make sure there are no shorts to the battery case. (6) Charging Time Chart: (Based on dead battery)

charger amp rating	hours needed for charge
.5	16
1	8
2	4
3	2½

Over-charging will NOT harm cells, just bubble away water. (7) After charging, unplug charger BEFORE removing clamps from battery terminals, as gases (H&O) coming from battery may explode if concentrated and exposed to sparks or flame. (Normally, explosive gas concentrations will NOT be present.) (8 When bubbling nearly stops (usually 10 to 15 minutes) reseal the screw vents, reconnect wires and replace lid—and go caving. Of course with spare bulbs and other GOOD light sources.

9. The battery is equipped with a built-in, self-resetting circuit breaker that will stop any current flows exceeding 4 amps. If this circuit breaker were not there, a short, for instance in your head lamp, could pull up to 50 amps, instantly heating the wire to the battery (down your back, inside your coveralls) red hot like a toaster wire.

10. We recommend charging take place several days before each planned use, to eliminate any detectable power loss due to the passing of time.

11. If battery is to be stored for a long period of time (half a year of more), store it in a discharged state. NiCd batteries do NOT have to be cycled (charged-discharged) at least once a month to maintain their rechargeability as do lead-acid batteries.

12. The proper elemental symbols for Nickel and Cadmium are Ni and Cd respectively, but sometimes (often) one sees Nickel-Cadmium rechargeable batteries referred to as NiCads— probably because it can be pronounced.

*NiCads are perhaps the ultimate storage battery, but are not in common use because of the rarity and related high cost of materials required to make them.

*BE PROUD, you are now a first-class electric caver.

Take Nothing But Pictures, Kill Nothing But Time, Leave Nothing But Footprints.

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Minespot Cap Lamp System For Caving Use

Minespot is an amazing new concept in electric caving lights. It is a very specialized, compact, sealed, rechargable lead-acid battery made originally for the strict demands of the mining industry, and has been modified exclusively for caving use by Lamp Factory. If properly worn, it will fit so comfortably as to practically go unnoticed. It is not for cave diving use, although we have used them in temporary submersion situations without any apparent damage. Minespot systems will take all the mud you can dish out, however! Our own special high efficiency #41 bulb will give up to 24 hours of bright light for general caving on each charge. Our #13 bulb will give up to fifty hours of light per charge. With proper care our minespot system will give many years of reliable use.

Your minespot is shipped in a fully charged state ready for use. Just plug the cap lamp into the connector from the minespot battery and flip the switch on the cap lamp. Notice that the two plugs must be properly aligned before insertion. To disconnect the system, simply press the small button on the side of the minespot connector and pull the plugs apart. The charger is connected to the battery in the same way. Proper use of the cap lamp requires strapping the cord around the side of your helmet so that the cord goes down your back. Standard wire straps may be used. Lamp factory hard hats are superior to fiber-metal helmets and include all mounting hardware. Put the cord inside your coveralls. This will help prevent snagging the cord on any rocks.

The battery may be worn on either hip, hence the cover is reversible so the cord will feed out either side. It is important to keep the plugs clean. Connecting the two units will keep dirt out of the plugs. Always carry spare light sources with you in the cave. Likewise, always take extra bulbs for your cap lamp. Assume that each bulb will burn out in about 15 hours even though it will probably last longer! The #41 will have a slight build-up of tungsten on the glass and may be replaced before burnout for maximum brightness if desired, although this effect will hardly be noticed. Bulbs are available through us or your local electronics store. We recommend Chicago Miniatures or General Electric bulbs. A good place to store spare bulbs is inside your cap lamp, but be sure they are taped securely so as not to cause any short circuits. Focusing the light beam is done by rotating the lens assembly of the cap lamp. You will find a wide flood is best for walking and a narrow beam is best for viewing over great distances. Notice also that the cap lamp swivels up and down for best viewing angle.

Check the connections at the battery and cap lamp periodically to make sure they are tight. After your cave trip, if desired, you may rinse mud off of your battery. Replace the small electrical tapes covering the waterports on the front of the battery if they are torn or scratched. From time to time you will probably want to remove the battery cover to clean around the top edge. Be sure no dirt falls into the two vents on top while the cover is removed. Clean your cap lamp too, if dirty.

IMPORTANT: Never leave the battery in a completely discharged state for more than a day. Charge it as soon as possible. For long trips use our special mobile charger. Charge the battery 1½ hours for each hour of use as a general rule with the #41 bulb. Charge 45 minutes for each hour when using the #13 bulb. Keep the battery upright for charging and storing over long lengths of time.

Once in a while the battery will need a little distilled water. Remove the small tapes on the watering ports. NOTE: Waterline should remain between the two graduations on the cell windows. The level drops some when the battery is discharged and hence water should only be added when the battery is fully charged. NEVER USE TAP WATER. DISTILLED WATER IS AVAILABLE IN MOST SUPER MARKETS FOR A VERY SMALL PRICE. Should mud get into the two ports, flush it out by inserting the needle tube on the filler bottle about ¼ to ½ way in and squeeze. After the mud is flushed away, wash off the tube. Then inject it all the way in and add water slowly as required. Notice that the water level rises slowly. DO NOT OVERFILL. Rinse off hhe needle tube after use.

Finally, keeping your cap lamp clean will insure maximum brightness. Never use an abrasive cloth to clean the reflector as it will scratch easily. When your life depends on reliable light sources, any care and maintenance will be worthwhile. MOST SPARE PARTS ARE AVAILABLE ON SPECIAL REQUEST. It is our firm belief here at Lamp Factory that any time spent in a cave should be spent in caving, not in repairing an electric or carbide lamp. Too often we have seen cavers with low quality light sources who will refute the value of electric cap lamps because they don't know what a professional system can do. Right now we have cases of using Lamp Factory Equipment in nearly 1000 hours of caving without so much as one second of lost time due to light failure. (Bulbs will always need replacement, however.) We hope that you also will take excellent care of your system; IT PAYS OFF!

Cave-Related Items

Following is a list of addresses of hard-to-find cave-related items.

General Information

National Speleological Society
Cave Avenue
Huntsville, Alabama 35810

Books

N.S.S Book Store
Cave Avenue
Huntsville, Alabama 35810

Speleo Books
P.O. Box 12334
Albuquerque, N.M. 87105

Equipment

Speleo Shoppe
P.O. Box 8044
Louisville, Kentucky 40215

Bob and Bob
P.O. Box 1187
Alhambra, California 91802

Blue Water LTD
P.O. Box 129
Carrollton, Georgia 30117

Recreational Equipment Inc.
1525 11th Avenue
Seattle, Washington 98122

Esse
368 South Meridian
Indianapolis, Indiana 46225

Ascenders

Gibbs Ascenders
854 Padley Street
Salt Lake City, Utah 84108

Cable Ladders

Winchester Cable Ladder
LBS—Box 824
Hartwell, Georgia 30643

Stream Trace

Hilton-Davis
2235 Langdon Farm Road
Cincinnati, Ohio 45237

Carbide Lamps

Justrite Manufacturing Company
2061 N. Southport Avenue
Chicago, Illinois 60614

Batteries (Lead Acid)

Mine Safety Appliance Company
201 Penn Center Blvd.
Pittsburgh, Pa. 15235

Batteries (Jell Cell)

Globe Battery
5757 North Green Bay Avenue
Milqaukee, Wisnsin 53201

El Power Corporation
2177 South Anne Street
Santa Ana, California 92704

Topo Maps

Washington Distribution Section
U.S. Geological Survey
1200 South Eads Street
Arlington, Virginia 22202

Sunto Compass

Forestry Supplies, Inc.
Box 8397
205 West Rankin Street
Jackson, Mississippi 39204

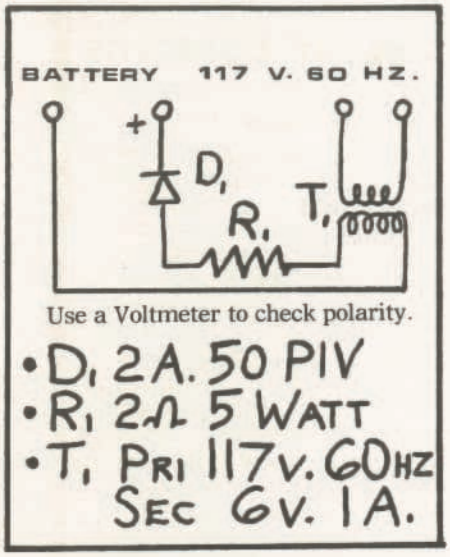
Next time you are in the woods listen real hard. You may hear a Cave Ho, Cave Ho. Relax, it's just a SWORCA member calling to his group. He has found another home.

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Building a Battery Charger

By John Evans

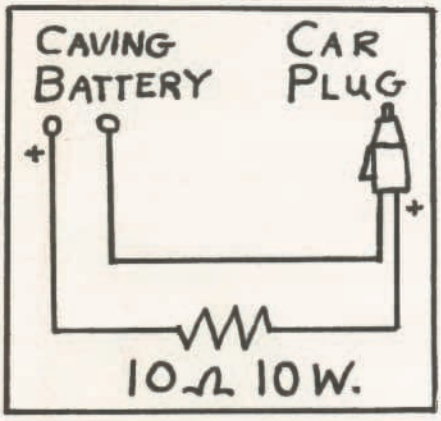
When you obtain a secondary battery, the next step is a charger. These can be purchased from MSA Pittsburgh for the Minespot System or you can build your own for any system. The simplest charger is as follows:



Use a Voltmeter to check polarity.

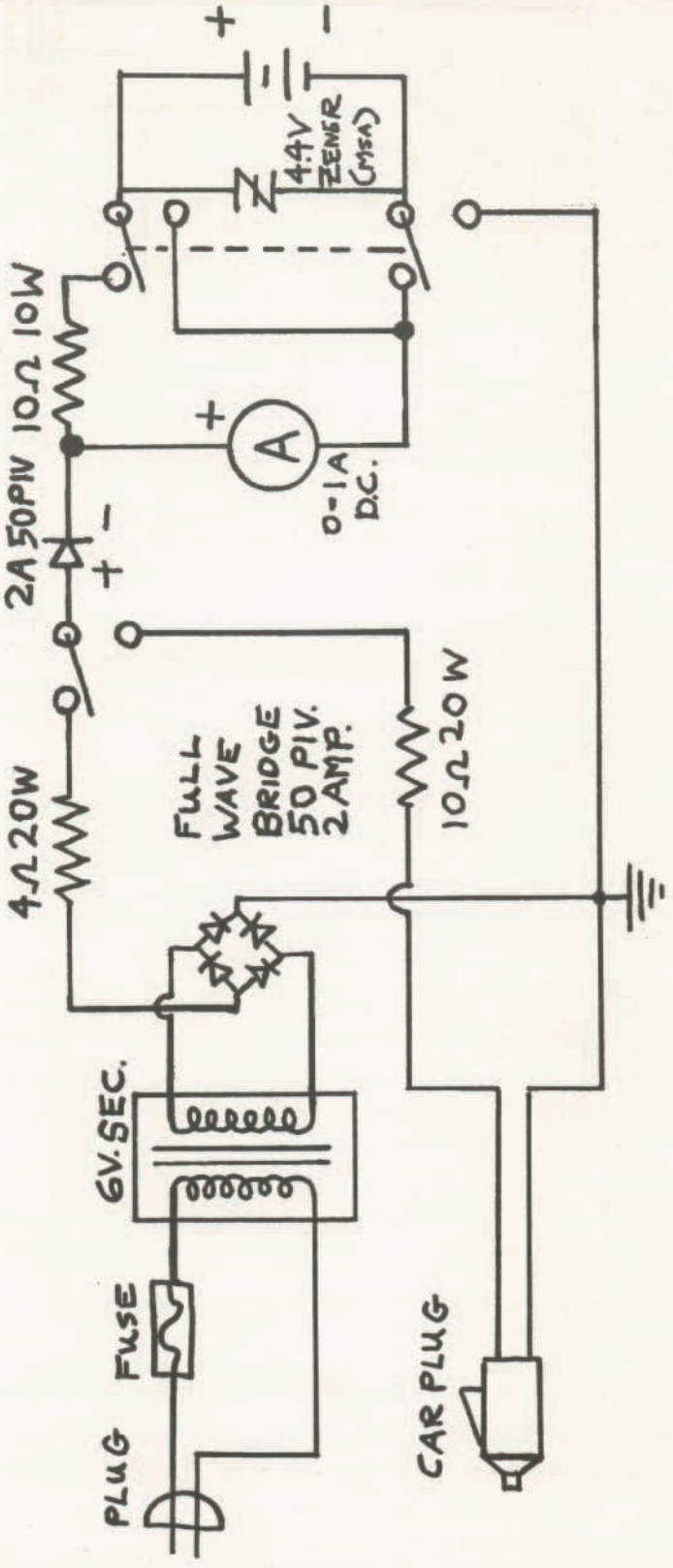
- D1 2A. 50 PIV
- R1 2Ω 5 WATT
- T1 PRI 117v. 60HZ SEC 6V. 1A.

A simple charger for mobile operation works off your car cigarette lighter plug.



If desired substitute an 1157 auto taillight bulb for the resistor and you will have an indicator of charger functioning.

This much more elaborate universal system is highly reccomended and can be used with a 4v Minespot or easily altered for a 5v (4 Ni-Cad) System. It uses both 117 volt house current and 12 volt car power and a meter indicates rate of charge and battery condition.



Sailing?—By Pete Miller

A creek full of water, whether swollen from rain or in it's natural deep state, does present a problem to a non-amphibeous vehicle.

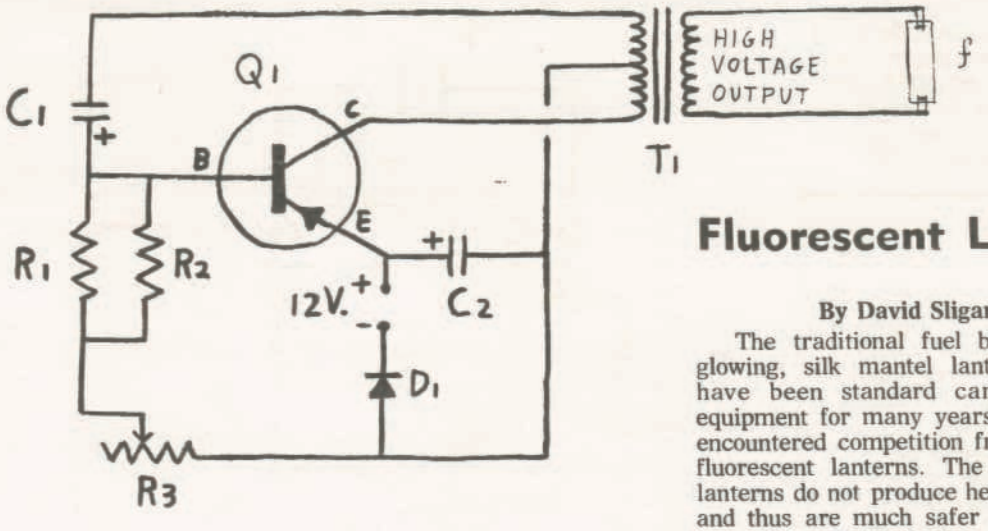
Experienced drivers know that usually success in a good dry forge across a creek starts at the bank. Ten minutes worth of work, involving removing the fan belts, can make all the difference in a successful voyage or a desperate bailing out, in mid-stream like rats from a sinking ship.

Every four-wheeled vehicle, no matter what design, will run partly submerged, so long as the fan is not showering the engine with water, thus shorting out the ignition system.

It is very important also not to let your carburator swallow water or your engine will turn into another Titanic.

So with your fan belt removed, doors shut tight and both hands on the tiller (steering wheel) you too can be a Columbus.

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Fluorescent Lanterns

By David Sligar

The traditional fuel burning, hot glowing, silk mantel lanterns which have been standard camp lighting equipment for many years, have now encountered competition from electric fluorescent lanterns. The fluorescent lanterns do not produce heat or fumes and thus are much safer to use in a tent. Designers of the battery powered fluorescent lanterns have used two methods to obtain the high voltages necessary to operate fluorescent tubes.

One method, as is used in the Burgess "Safari-Lite," is to use high voltage batteries. The "Safari-Lite" utilizes a pair of 69-volt batteries. This pair of batteries costs approximately 10 to 15 dollars and will power the unit for 3 hours every weekend for a year.

Another method, which has been used by several manufacturers, is to use several standard 6-volt, spring contact lantern batteries in conjunction with a power inverter circuit to provide the high voltage necessary. These power inverter units are not as efficient as the high voltage battery units and the batteries will not last as long.

The following circuit is one which I have used in my experiments at building fluorescent lanterns of the power inverter type. This circuit functions quite well from a 12-volt D.C. power source. Beware that the output of this circuit is high voltage. The power transistor must have an adequate heat sink to prevent thermal runaway. When the circuit is ON, advance the variable resistor until the fluorescent tube lights brightly and then back it off to conserve power and prolong the fluorescent tube's life.

PARTS LIST

C1 .1uf 50 VDC
C2 500.uf 50 VDC
R1, R2 560 ohm ½ watt
R3 1000 ohm 1 watt pot
D1 1.amp. 50 P.I.V.
Q1 HEP 230 or substitute
T1 120 V.Pri. 12 V.C.T. Sec.
(used backwards as step up transformer)
f fluorescent tube(s) (available in 9 and 11 inch lengths for lanterns)

Instructions for Lamp Factory Specially Altered Chargers

(115 volts 60 hz)

By Rich Sellers and Tim Kettering

This charger is for use with the Minespot Battery and Cap Lamp System. Charge 1½ hours for each hour of use with a #41 bulb. Charge 45 minutes for each hour, when using a #13 bulb. Never let your battery remain in a fully discharged state for more than a day. Charge as soon as possible. Do not overcharge your battery. Keep your battery upright when charging and storing. Some heat generation is normal during use of this charger. Just to be safe, however, keep the unit away from anything that might be affected by heat. If possible, cycle the battery at least once a month, if it is not used. This means that your cap lamp should be turned on a few hours and then charged an appropriate length of time. With proper care your system will provide many years of reliable light for caving. Always unplug charger completely after use.

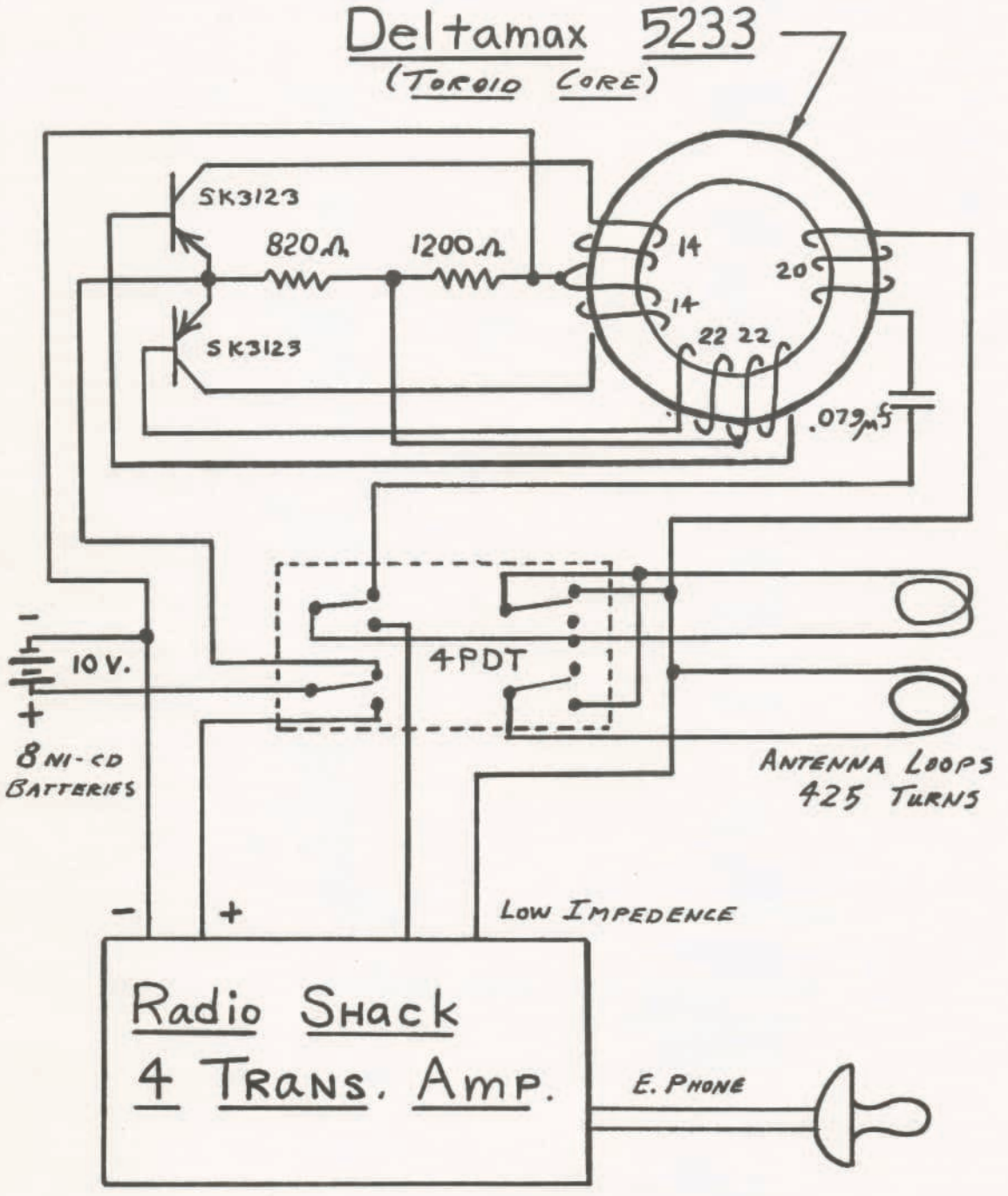
Take Nothing But Pictures,

Leave Nothing But Footprints.

Kill Nothing But Time,

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CAVE "RADIO" LAYOUT



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Magnetic Induction Cave "Radio"

By Richard Sellers

The tremendous linear distances traveled in Goochland Cave raised questions on the accuracy of the SWORCA survey to pinpoint many passages in relation to surface topography. The answer was found by Tim Kettering and Richard Sellers in the construction of an accurate navigation instrument, a magnetic induction cave "radio."

Although not a true radio in the sense of frequency, our cave "radio," as we call it, is a set of two highly directional transceivers. One is taken in the cave, the other remains on the surface.

The transmitter consists of an 18-inch diameter coil fed by a powerful audio frequency oscillator and creates an alternating magnetic field that penetrates up to 500 feet of solid limestone. The receiver is an even larger (27-inch) coil tuned to an audio amplifier.

The underground coil is placed at a desired point in the cave and is leveled very accurately. The magnetic field lines are vertical at the center of the coil and fan outward radially as one progresses outside the coil. The surface unit then listens to the pulsating audio tone and rotates the receiving coil very carefully. Field lines may then be traced by nulling out the received signal. When the field lines are perfectly vertical, this of course means that one is on ground zero directly atop the transmitter.

The above method is surprisingly accurate. Moving the transmitter less than one foot at a depth of 100 feet will still be easily detected. Map accuracy is then checked with assurance. Depth may also be determined mathematically by measuring the angle of the field with the vertical at a given distance (along the ground) from ground zero.

CONSTRUCTION: To attempt building your own unit is a mammoth undertaking. Figure over $100 in parts and at least 50 man hours per unit (with antenna). If you are also willing to tune both transmitters and receivers with a V.T.V.M. or oscilloscope you may then end up with a very useful piece of cave surveying gear.

Below is our schematic diagram. We have incorporated 8 ni-cad batteries in series as a power source. This gives the necessary stable discharge curve since the frequency of this simple oscillator is voltage dependent.

One final note: A simple solid-state multivibrator timing circuit to pulsate the transmitter will greatly increase range. The "beep" helps considerably to distinguish the signal from random noise during adverse conditions.

Rick Sellers scans a probable spot for signals 100 feet below the surface.





Tom Owens Sits Patiently

Long time resident of his quaintly decorated home, Thomas Owens once ran the Goochland Post Office and General Store. Now that old barn is full of world war days remnants and interesting old gadgets. The pigeon holes are still there; so is Tom's old hand-made sandstone grinding wheel. Mr. Owens is a "Jack-of-all -Trades." His own woodcarving of a moonshine still is one of the possessions he likes to show to visitors. In Tom Owen's back yard is a cave, rummored to connect to a second entrance in Jackson County. Be sure to wave on your way to Goochland! Tom will be there.

Unprecidented Friendly Cave Owner Relations in Rockcastle County

By Richard Sellers

Not so long ago I visited the owners of a well traveled cave in Indiana. It was a sunny Sunday when I knocked on the door and a few seconds later an elderly lady greeted me. "Hello . . . I'm Richard Sellers from Cincinnati," I said. "We have a group of fellows who like to go in caves and we would like to ask your permission to . . . "

The mood changed instantly and the lady, in total disgust, said, "Get off my property, and don't ever come back! You've burned my woods, nearly burned my house and barn and now you want me to let you back in that cave!"

This is a classic example of what happens when the general public gets hold of a book like Richard Powell's "Caves of Indiana."

No cave owner has an obligation to let cavers on his land. He is doing a great favor to let people enter his cave and certainly doesn't want to be bothered by a constant stream of traffic. This is a major reason for some degree of secrecy in giving out locations and other information.

My sincere hope is that no "Caves of Indiana" type publication will destroy relations in Rockcastle County. SWORCA has made extraordinary efforts to maintain every courtesy to cave owners know and we have had that courtesy returned to us. Cave owners know our group well and in 99% of the cases are eager to invite us in to talk or in some cases stay for dinner.

It's owners like John Clark, Matt Powell, Tom Owens, Ben Cobb, John Cope, Johnny King, Richard Mullens and many, many others who have made some of the finest caving relations I have seen. The extra efforts to change clothes out of view of farmers, always ask permission, show or give a copy of maps to owners, and extend all verbal courtesy will be rewarded.

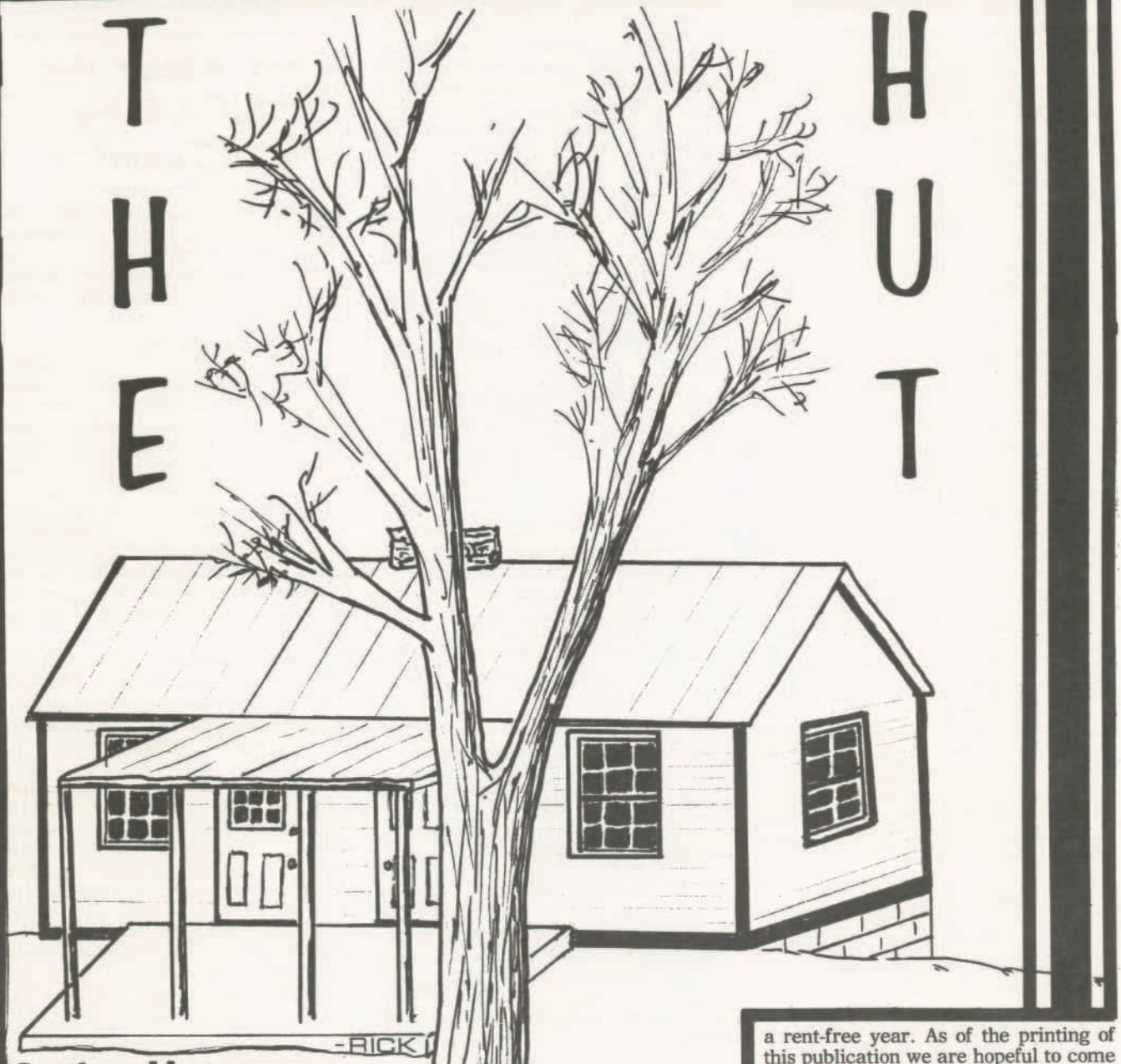
In many cases, such as Oscar Miller and the owner of Smokehole Cave, the local people will come in and throw an all night beer party underground and screw things up royally for cavers. These cases are comparatively scarce and by showing proper caving courtesy, most farmers will be aware of the difference between you and the troublemakers, and will gladly continue to let your group enter their caves. There is a right way and a wrong way to most everything. In the long run it's the farmer that pays off.

Caver's Quotes

I can't go caving, the tobacco's too high to get through!

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PAR EXCELLENCE!



Speleo Hut—

What do you do when you go caving almost every weekend and need a place to eat and sleep? How about all the times you disturbed the services at Climax Church when eight or ten cavers file back to cars on Sunday morning with sleeping bags and caving gear in hand, right outside the windows of the church? Obviously SWORCA had no choice but to find a place of its own, something we could call our home away from home.

Outside it doesn't look like much, but inside, to cavers at least, it's a palace. Heated in winter, dry when it rains, wall-to-wall carpeting, fully.-furnished, outhouse , running cave water, locker room, storage space, soda straws hanging from the ceiling (false ones), complete kitchen with stove, refrigerator, sink, exhaust fan, lowered ceiling and hand-crafted stained glass chandelier. You name it. All of it comes from the efforts of SWORCA cavers donating time and material.

The agreement with John Clark is to pay rent per month, however Mr. Clark agreed to accept our installation of a running water system in return for a rent-free year. As of the printing of this publication we are hopeful to come out even for the year or maybe slightly ahead. In any case the Speleo Hut is a unique place and a place where all SWORCA cavers meet the night or morning before a trip. To us it's almost a necessity and we remember many enjoyable moments from the past year or so.

There was the turkey feast with ten people the night after we installed the pump system, the countless ruckesses when we couldn't go caving and had to let off some energy, the wolf cries tape recorded under a full moon, echoing off the rocks down Climax Valley, the case of the green water, need we say more? The Speleo Hut is open to all SWORCA members and for a trivial fee it is a comfortable asset to any caving trip.

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Stream Dye Tracing

By Tim Kettering

Fluorescein dye powder sometimes called Uranine or sodium salt of fluorescein, in an inexpensive way to trace streams underground. Fluorescein dye powder is sometimes orange-red in color. When mixed with water it turns a yellow-green.

The quantity of dye needed varies to the volume and distance of the flow. About one ounce for one mile or less; up to eight ounces for three miles, add more for larger volumes. The dye should be mixed with water in a glass container and poured into the stream.

Stream dye indicators are good watchdogs. The indicators put in every resurgence will catch a trace of dye 24 hours a day, and will hold that trace of dye up to six weeks, if it passed by.

To make the indicators, put a teaspoon or more of activated charcoal inside of a mesh container; plastic window screen folded over and stapled, or nylon hosiery knotted at each end.

To test the indicator to see if the dye came through the resurgence, mix a 5% solution of potassium hydroxide in ethyl alcohol. Put the charcoal from the indicator in a glass jar and pour the solution over the charcoal. Compare the difference and record your test.

A good black light is used in detecting small amounts of dye. Also some water works fill long glass tubes to look through deep amounts of water.

Before the dye is put in the streams, the indicators should be tested. Pollution can affect the test and this should be noted. Be sure the indicators are wired on good. It is also a good idea to ask the owner's permission before tracing the streams. Fluorescein can give you very bad land owner relations if used irresponsibly. You would be surprised with the reaction you get from the land owners when their drinking water turns yellow-green. Remember it can take a long time before the dye appears. It is a good idea to test the springs a couple of times.

You can obtain the dyes from:

Pylan Products Co., Inc.
95-10 218 Street, Queens Village
New York 11429

Under the name of Dyla-tel tracing dyes.

Their dyes are oil, water or alcohol and are water soluable. Minimum order is $25.00.

1-4 lbs. . . . . $8.50 per lb.
5-25 lbs. . . . . $7.00 per lb.
25 lbs. and over. . . . . $6.50 per lb.

They can also be obtained from:

Hilton-Davis Chemical Co.
Division Sterling Drug Co.
2235 Langdon Farm Rd.
Cincinnati, Ohio 45231
(513) 841-3790

Under the name of Hedacid Uranine. Mix No. 4343-B. Minimum order 25 lbs. for $100.00.

Stream Tracing Report

Southwestern Ohio Regional Caving Association traced water from the big entrance of Climax (stream in south side of the entrance) to Grandma Cave. Time: 20 minutes—and to Climax Spring and 3 springs across the road. Time: 3 hours.

John Evans and Rick Sellers in California's Crystal Palace Cave

It was that kind of dry, dusty, desert-like day that makes a caver want to carry his coveralls to the entrance rather than sweat like a sponge. John Evans and Rick Sellers had driven ten miles down a forest service dirt road in the 95-degree temperature. The closest place to park was a mile and a half away and a 1400-ft. steep descent down a craggy trail. "I remember my feet burning on the hot dust as I walked," complained Rick. In fact everyone was uneasy. Temperatures rose in the arid valley as the cavers proceeded, but finally cool breezes from the entrance revived the party as they sat and rested. Outside temperature was now over 100 degrees.

Crystal Palace Cave is located in the isolated reaches of the Stanislaus National Forest near the sight of the 1975 NSS Convention at Angels Camp California. Several NSS cavers turned out for the trip which was sort of spontaneously scheduled for that day. Sometimes the best trips are those smaller, unplanned ones. That's one reason we decided to go. The other reason was that one of the cavers in the party "seemed" to know where the entrance of Crystal Palace was.

As it turned out the hike from car to cave was far more intense than the in-cave trip. The cavern is highly adorned with white flowstone, draperies, and of special interest to "Eastern Cavers," some beautiful pallates made of a white marble-like rock. In fact this rock was in abundance in the cave and provided a striking contrast to the familiar Rockcastle brown that we all know and love.

The only problem encountered was the fact that Rick's strobe flash was not working and John had to provide all the light for photography. We crawled around one small bend and found white helictite clusters posed silently for the photographers and traded off on the only working flash. Soon out of both time and film, we returned to the entrance.

Most caves in California are very short and dry compared to SWORCA caving country, but in some ways are contrastingly beautiful. On their journey through the West, Rick and John did little caving, although Crystal Palace will remain as one of the highlights of their trip.

What About the SWORCA Cave Rescue Team?

By Richard Sellers

When you cave every spare moment of your life, you get to thinking about the laws of probability: "The more you cave and the more difficult the trip the more chances you have for an accident."

There was the trip into Poplar Pit when the Blue Water II wasn't padded properly and nearly wore through. Then there was Mary's waterfall "Slide" in River Styx and the time Tim chipped his knee in the floodwaters at Goochland's entrance or the time I fell twelve feet and twisted my ankle, not to mention the flash flood when Werner Jud, Pete Miller and I were trapped 24 hours. There are many others of course, and it can't be denied that caving is a dangerous business for the experienced caver, let alone the NURDS.

That thought created the need for a Cave Rescue Team. So many SWORCA members enrolled in a beginning first aid class, then an advanced class, specially accented for caving situations by our volunteer instructor for the Red Cross. Thus Pete Miller, Werner Jud, Tim Kettering, Bill Hastings, Marv Knasel, Mary Gratsch and Rick Sellers all have had their Advanced First Aid Rating. A few months later Tim Kettering and I attended a meeting with the Daniel Boone National Forest Rangers at Winchester, Kentucky and many interested cavers and climbers, in regard to a state-wide cave and mountain rescue group. Since the first meeting we have not been in touch with the forest service, but will continue to assist or lead any rescue efforts as they come up. We usually have the manpower and some of the equipment for a minor rescue, several of which we have been on. Also we have the knowledge to help each other should an accident occur in our own group.

More importantly, I hope that all SWORCA members have gained an appreciation for the attitude that caution and common sense can prevent the need for a rescue.

If SWORCA is needed to help on a major rescue we can be contacted almost anytime at (513) 481-5810 or (513) 531-1750.

Caver's Quotes

We gotta stop cavin, the turkey's almost done!

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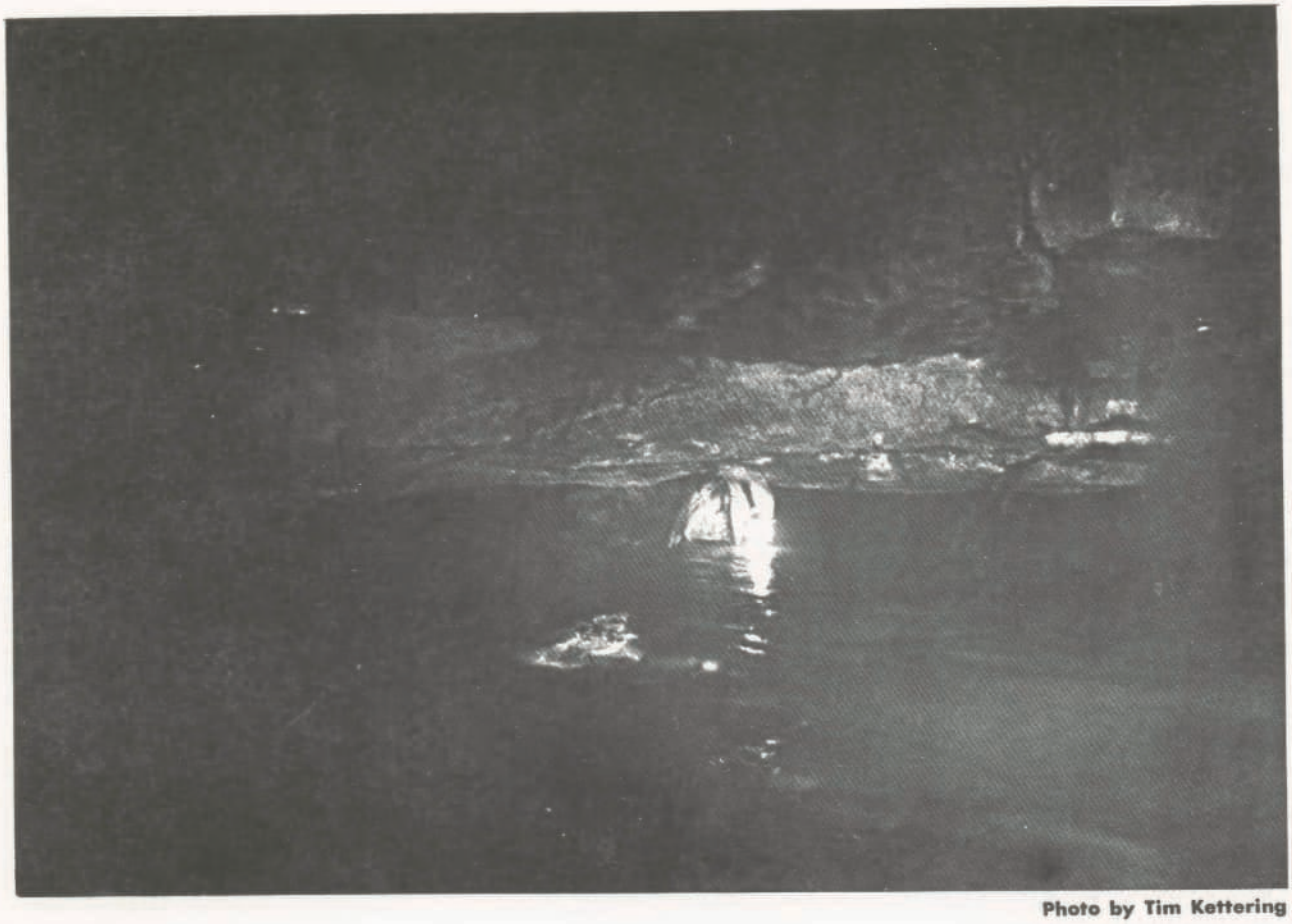


Photo by Tim Kettering

WERNER JUD ENJOYING A WATER CRAWL

Criteria for Caving Helmets

About two years ago I bought a Fiber Metal Helmet. I thought it was great. It was lightweight and comfortable, in fact so comfortable I even wore it at work. I was about 15 feet high when it fell to the sidewalk. When I picked it up I was startled to find it cracked. It was then I started wondering what would happen to the wearer should a rock fall on it.

So I looked into safety requirements for helmets and found American National Standard Institute has the standards for hard hats.

A.N.S.I. Z89.1—Requirements for 1969.

A.N.S.I. Z89.2—Requirements for 1971.

To break down the requirements even further:

(a) Class "A" requires limited dielectric protection.

(b) Class "B" requires highest level of dielectric protection.

(c Class "C" requires no dielectric protection.

"Dielectric" means high voltage electricity.

Class "B" Helmets were chosen because they offer the most comprehensive head protection available.

Methods and Equipment

(a) Impact Testing

An 8-pound steel ball is dropped 5 feet above the helmets from an electromagnet. It is guided during the fall. The force is transmitted through the helmets to a headform. Aluminum bars are used to pick up the impact from the headform. (See Brinell Hardness Penetrator Assembly Drawing)

The bars are required to have an average Brinell hardness between 21 and 24. (See Transmitted Force in Pounds Table) The maximum allowable variation of 0.88 Brinell Units between the two ends of a 7" long bar. This test was performed for at least two hours. Ten helmets were conditioned at 0°F and ten at 120°F.

(b) Penetration Resistance

A 1-pound penetrator with a 35° tip angle was dropped from 10 feet by an electromagnet on the helmets. The depth of penetration in each shell was measured amd averaged for six specimens.

(c) Check In and Examination

1. Check on the dimensions of nape strap headband and sweatband.

2. Adjustment instructions.

3. Proper labeling.

4. Shell was checked for seams and holes.

5. Must be at least 1.25 crown clearance.

(d) Weight

Six specimens of each model were weighed and the average reported.

(e) Water Absorption

Six dry helmet shells were weighed, soaked in tap water for 24 hours and weighed abain to determine the amount of water absorption.

Insulation Resistance and Flammability were left off because these tests would not have any bearing on caving.

Conclusions

All of the helmets passed the penetration test. This is the test I was most concerned about because of the Fiber Metal Helmet cracking on me.

Ninety-Five percent of the models tested failed at least one of the requirements of Z89.2. Sixty-Seven percent of the models failed more than one requirement.

Only one model (Willson 66JC) met all the requirements. Erb 906, Goodall G.Y.C.-E and M.S.A. 454704 failed only the checking inspection items. Goodall GYC-E does not allow suspension adjustment over the required range. None of the M.S.A. models . had adjustment marked on the headband.

Cavers should be concerned to pick a good helmet that passes the test. Especially the impact test. It may mean the difference between yelling at the nurd that just dropped the rock or a headache, or even worse a busted head.

By Tim Kettering

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Transmitted Forces in Pounds

Diameter of impression, millimeters	Brinell Hardness Number												
	18	19	20	21	22	23	24	25	26	27	28	29	30
3.9	485	515	540	565	595	620	650	675	700	730	755	785	**810A**
4.0	510	540	570	600	625	655	680	710	740	765	795	**825**	850
4.1	540	570	600	630	660	690	720	750	775	**810**	**835**	865	895
4.2	565	600	630	660	690	720	755	785	**815**	850	880	910	940
4.3	595	625	660	695	725	760	790	**825**	860	890	925	955	**990B**
4.4	625	660	690	725	760	795	**830**	865	900	935	**970**	**1000**	1040
4.5	650	690	725	760	795	**835**	870	905	940	**975**	1015	1050	1085
4.6	680	720	760	795	**835**	870	910	950	**985**	1025	1060	1100	1135
4.7	715	755	790	**830**	870	910	950	**990**	1030	1070	1110	1150	1190
4.8	745	785	**825**	870	910	950	**990**	1035	1075	1115	1155	1200	1240
4.9	780	**820**	865	905	950	**995**	1035	1080	1125	1165	1210	1255	1295
5.0	810	850	900	945	**990**	1040	1080	1130	1175	1220	1265	1310	1355
5.1	**A845**	895	940	**985**	1035	1080	1130	1175	1220	1270	1315	1365	1410
5.2	880	930	**980**	1030	1080	1125	1175	1225	1275	1325	1370	1420	1470
5.3	920	**970**	1020	1070	1120	1175	1225	1275	1325	1375	1430	1480	1530
5.4	955	1005	1060	1115	1165	1220	1270	1325	1380	1430	1485	1535	1590
5.5	**B990**	1045	1100	1155	1210	1265	1320	1375	1430	1485	1540	1595	1650
5.6	1030	1085	1140	1200	1255	1310	1370	1425	1480	1540	1600	1655	1710

NOTE 1: Values below line A exceed or are equal to the specified average force.
NOTE 2: Values below line B exceed or are equal to the specified individual force.

ANSI Z89.2—1971 Requirements for Class B Industrial Helmets

TEST	REQUIREMENTS
Impact Resistance	The average force at each test temperature must not be greater than 850 pounds with no individual force exceeding 1000 pounds.
Penetration Resistance	The average depth of penetration must not exceed 3/8 inch.
Component Construction	The shell must not have any holes through it; the headband must be at least one inch wide; no metal parts are allowed; a sweatband must be provided; the shell must be marked to indicate the manufacturer and ANSI classification.
Size Range and Marking	The headbands must be adjustable from the size 6 1/2 to 8 1/2 size increments; size range and adjustment must be permanently marked on the headbands.
Suspension Adjustment Instructions	Instructions must be supplied with each helmet.
Crown Clearance	The clearance must be at least 1.25 inches.
Weight	No complete helmet can exceed 15.5 ounces.
Water Absorption	The shell must not absorb more than 0.5 percent water.

NOTE: Requirements for Insulation Resistance and Flammability were omitted because Caving Helmets do not need these requirements.

Mfg./Model	At 120°F. Ave. Force	At 0°F. Ave. Force	Penetration Depth Inches P/F	Component Construction	Size Range Marking	Suspension Adj. Instr.	Crown Clearance in. P/F	Weight Oz. P/F	Water Absorption % P/F	Max. Force At 0°F.	# over 1000	At 120°F. Max Force	# over 1000
American Optical BX-18	817	699	3/16 P	P	P	P	1.50 P	12.6 P	.11 P	786	0	1301	3
Apex E2-A	1648	910	1/8 P	P	P	P	1.42 P	12.9 P	.01 P	968	0	2075	10
Bullard 302DMY	644	849	3/16 P	P	P	P	1.50 P	12.0 P	.27 P	944	0	698	0
Cam-Hi CH-71	66j	836	1/4 P	P	P	F	1.38 P	12.1 P	.19 P	921	0	832	0
Eastern TUF-E	1414	920	3/16 P	P	P	F	1.75 P	14.0 P	.21 P	1151	1	2008	10
Erb 906	572	749	3/16 P	P	P	F	1.50 P	12.4 P	0 P	1000	0	633	0
Fibre-Metal TF-2	796	966	3/16 P	P	P	P	1.50 P	13.5 P	.02 P	1108	3	985	0
Fibre-Metal E-2	776	990	3/16 P	P	P	P	1.50 P	12.9 P	0 P	1159	3	937	0
Glendale 9500	676	1056	3/16 P	P	P	P	1.67 P	14.7 P	.17 P	1949	3	782	0
Goodall GYC-E	490	747	1/4 P	P	F	F	1.67 P	12.0 P	.21 P	842	0	875	0
Jackson SC-4	544	713	3/16 P	P	P	P	1.50 P	13.0 P	.20 P	764	0	573	0
MSA 454704	746	771	3/16 P	P	F	P	1.50 P	12.8 P	.15 P	845	0	836	0
MSA 455811	697	694	1/8 P	P	F	P	1.59 P	11.7 P	.18 P	1016	1	748	0
MSA 454721	752	750	1/8 P	P	F	P	1.50 P	11.9 P	.38 P	1038	1	1443	2
Safety Supply of Canada 2650	672	692	3/16 P	P	P	F	1.75 P	11.6 P	.07 P	962	0	897	0
Schuberth Ber/PL	732	995	3/16 P	P	P	F	1.75 P	12.8 P	0 P	1093	5	1437	2
US Safety 806Y	943	769	3/16 P	P	P	P	1.25 P	13.4 P	.06 P	968	0	1393	5
Welsh 4315	654	839	3/16 P	P	P	P	1.38 P	14.7 P	.09 P	879	0	769	0
Welsh 4265	891	1423	1/8 P	P	P	P	1.08 F	12.0 P	.36 P	2546	5	1519	2
Welsh 4375	791	793	3/16 P	P	P	F	1.25 P	12.7 P	.30 P	875	0	1933	1
Willson 66JC	612	740	3/16 P	P	P	P	1.50 P	14.8 P	.22 P	774	0	787	0

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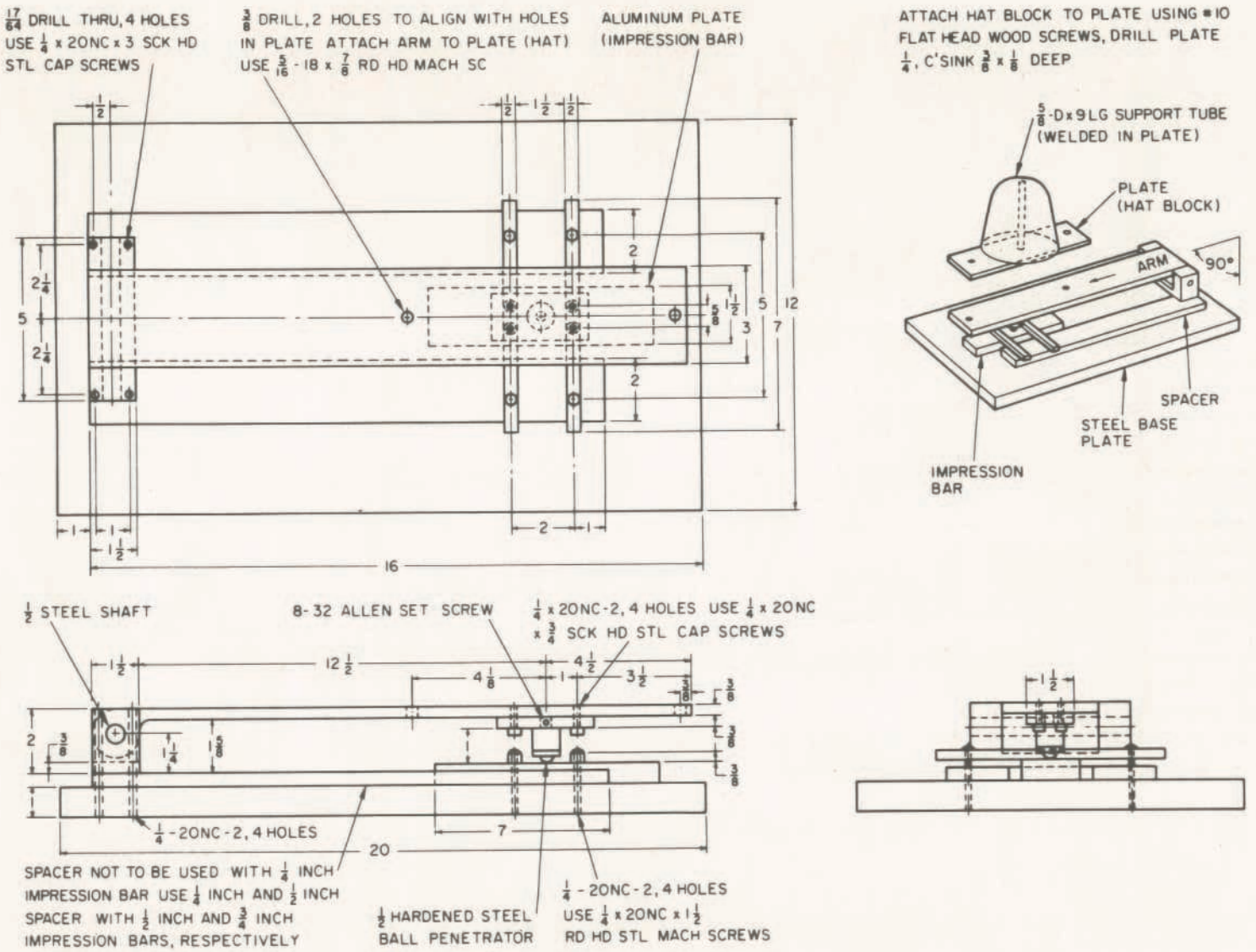
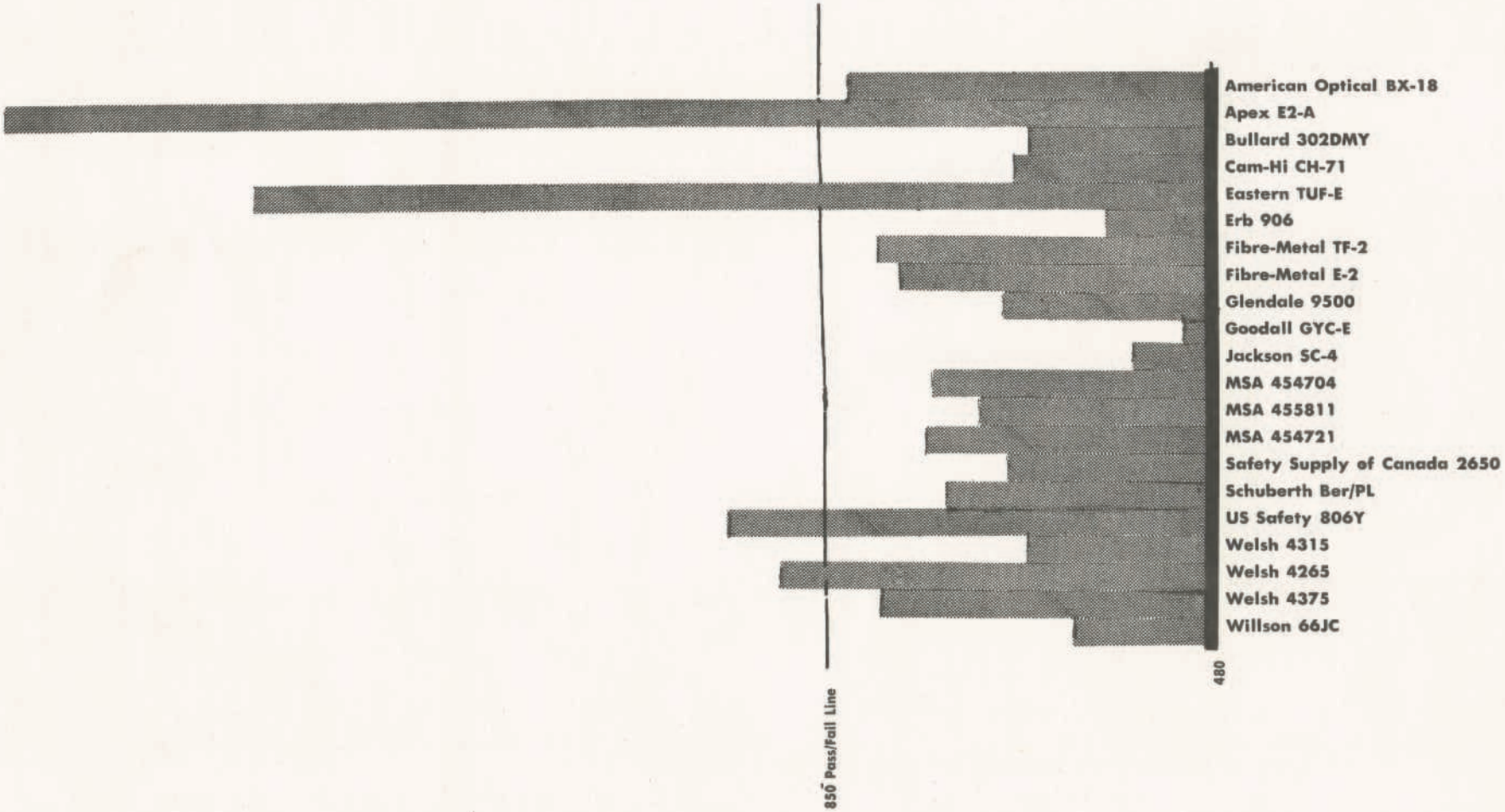


Fig. 1
Brinell Hardness Penetrator Assembly

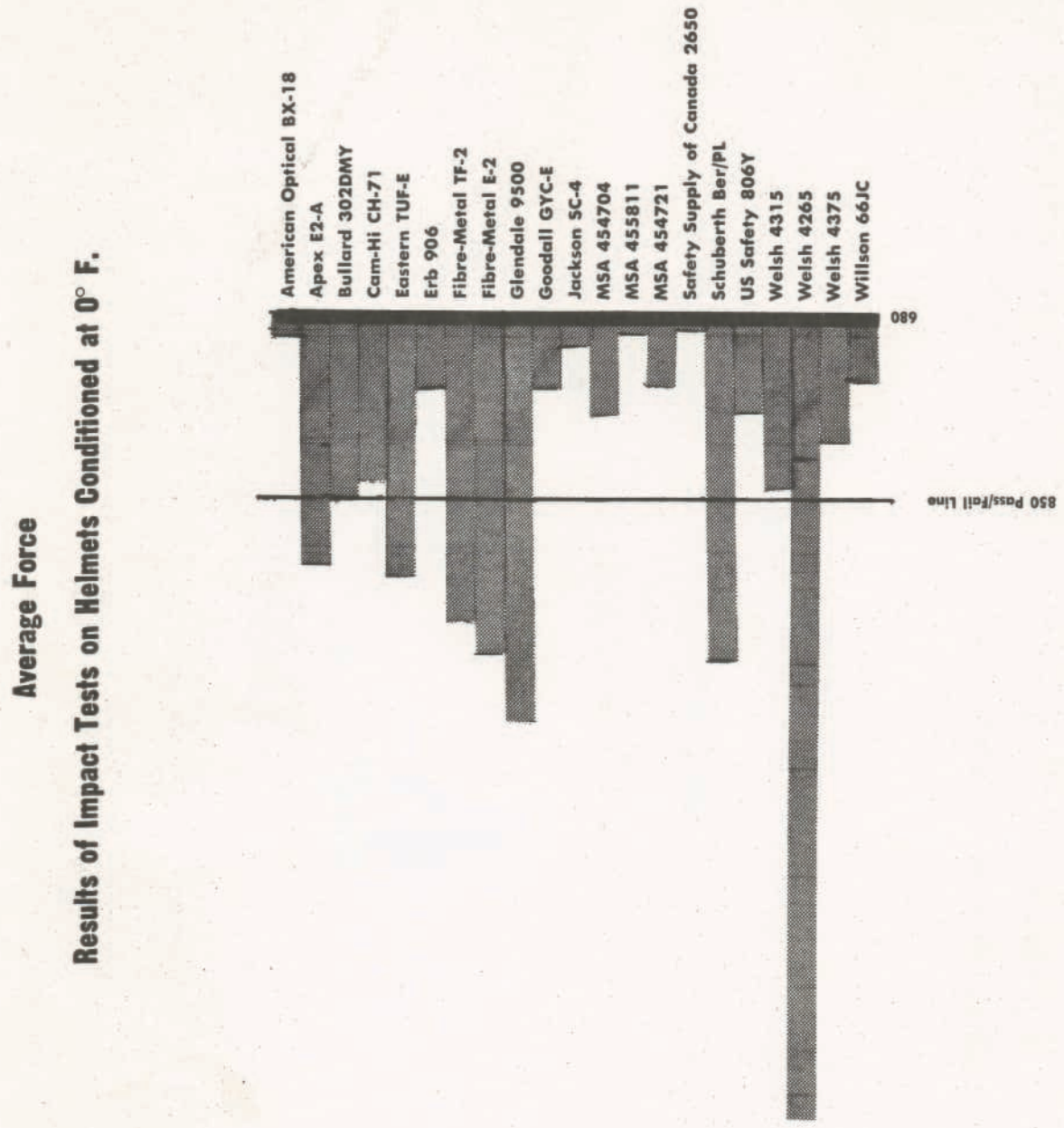
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Average Force

Results of Impact Tests on Helmets Conditioned at 120° F.



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Just Makin The Best of A Bad Situation

By Werner Jud

Well I know a caver
He's a mighty fine caver
Climbs up and down, crawls around
Stays underground for a long, long time
(Well) One day he's crawling in the mud
And the place starts to flood
And he can't get out—trapped like a rat
Well it's none-"uh" my business
So he moves deeper in, to higher ground
Sits by a sterno till the water goes down

So I ask him—"Why do ya come inside of these caves?
Liable to fall—liable to freeze
Certain for sure—ya bang up your knees
(Well) Water's cold as ice, can come up high
Ya can lose your way—Ya probably die
"well it's none uh my business" (well) He's sitting pretty still, gives the slightest little groan
And he says to me
"I knew it'd be tough,"
"I knew it'd be rough,"

But ya gotta find out where this cave end up
Besides all that, there's one sure thing,
I never promised you a rose garden!"
I guess he's making the best of a bad situation.
Don't wanna make waves, don't you see.
He's just making the best of s bad situation.
Reckon I'd do the same if it were me.

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CAVER STANDS ATOP BIG BAT THRESHOLD AS WATER PLUNGES

Photo by Tim Kettering

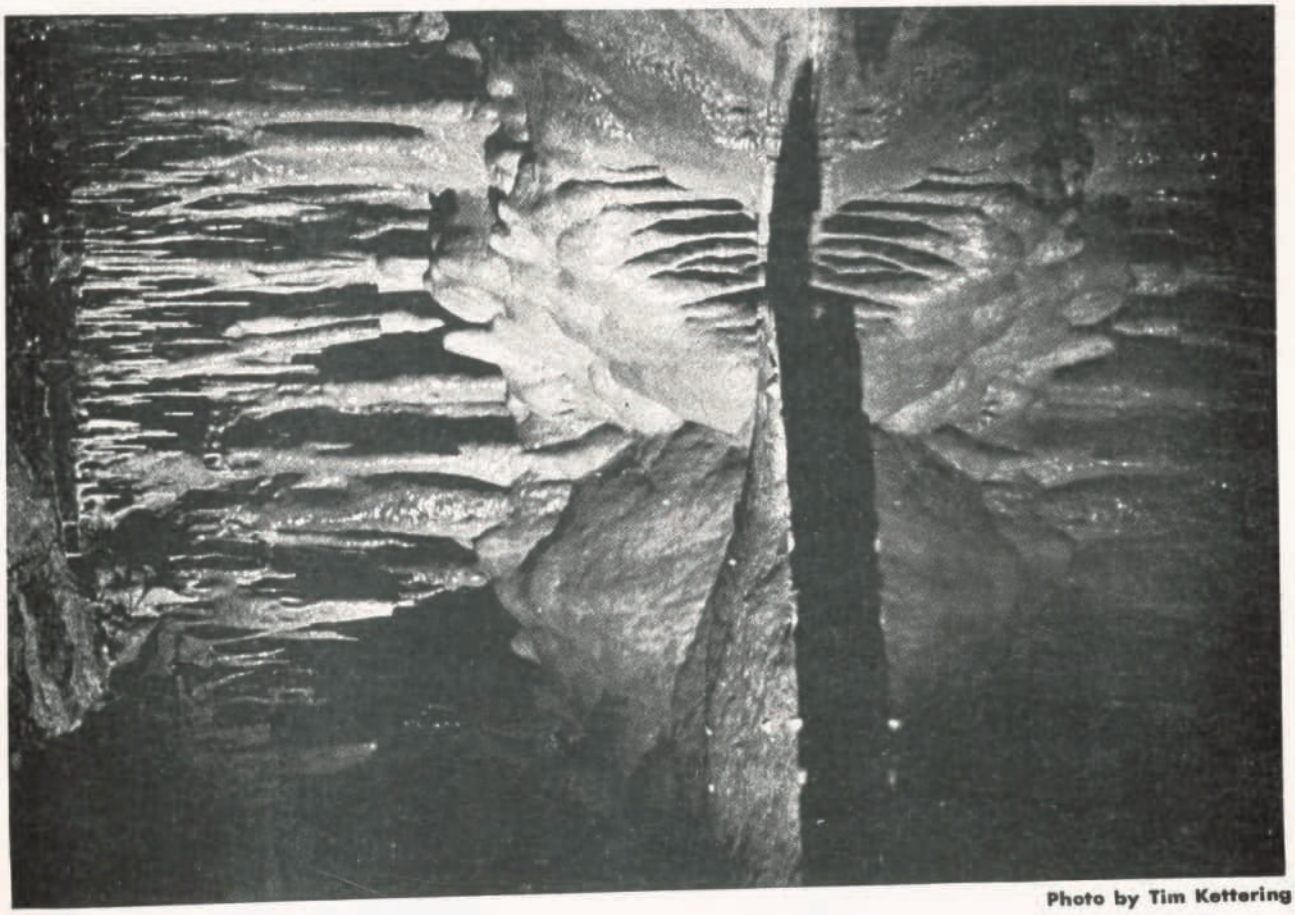
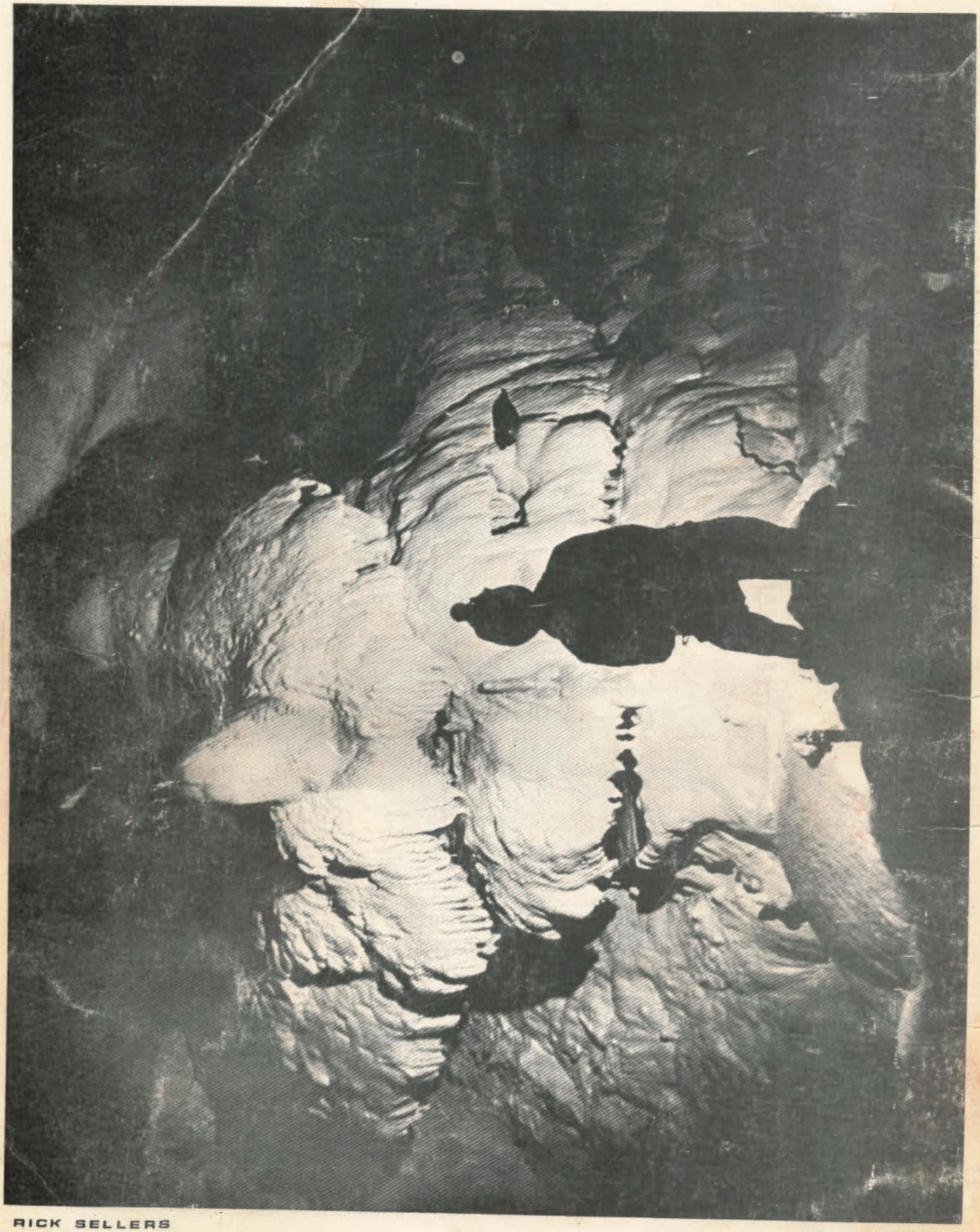


Photo by Tim Kettering

REFLECTION POOL, JEWEL BOX CAVE, INDIANA

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RICK SELLERS

SILHOUETTES FLOWSTONE IN PINE HILL CAVE, KENTUCKY

Photo by Tim Kettering

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