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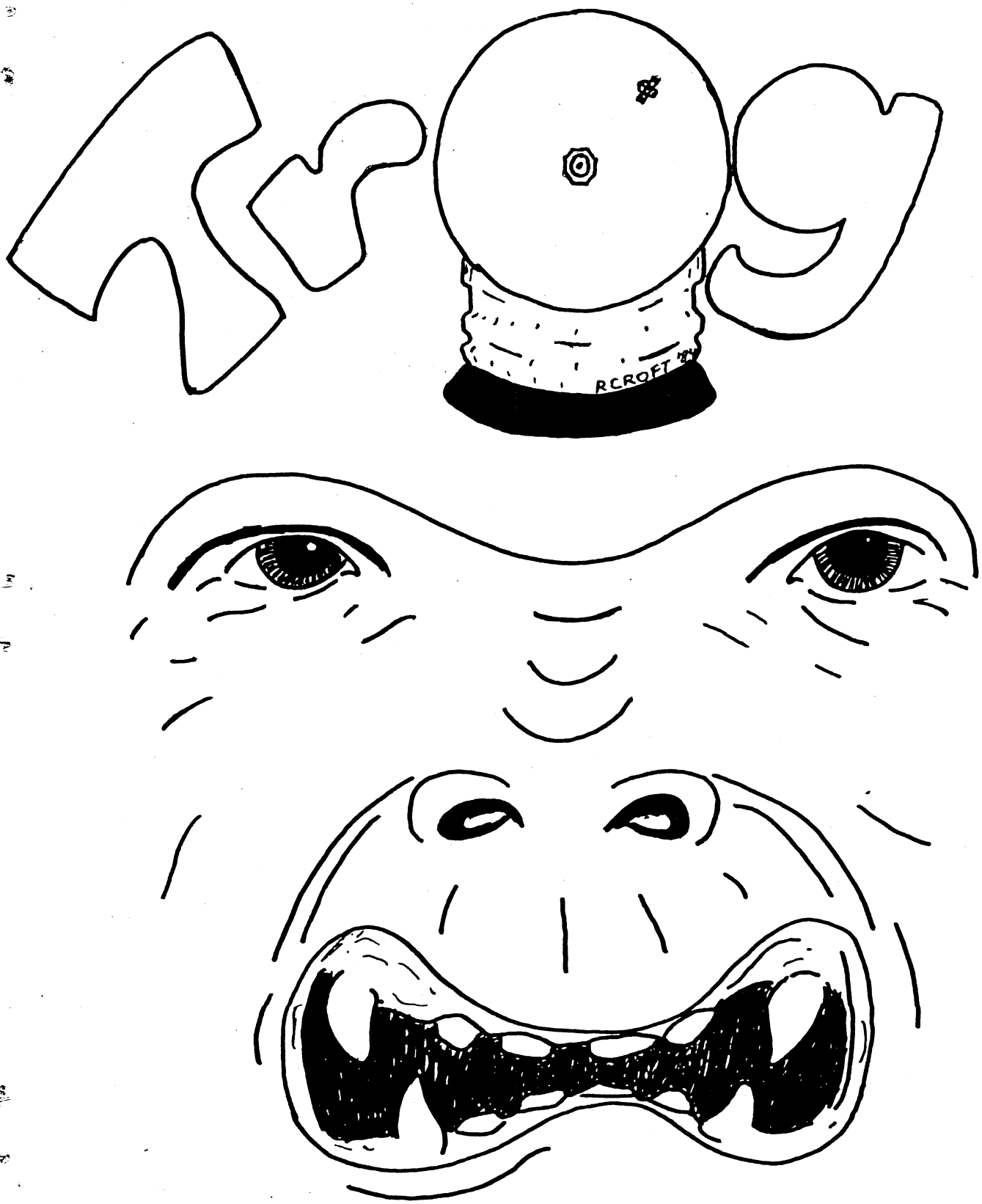
RICHARD COBB



The Tech Troglodyte Vol 24 No 1

THE TECH TROGLODYTE

A JOURNAL OF THE VIRGINIA TECH GROTTO OF THE
NATIONAL SPELEOLOGICAL SOCIETY

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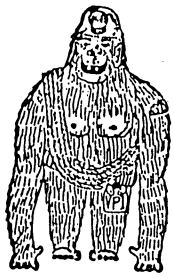


President's Column

O.K. Another year and its my turn to write a president's column. Already we've had a few projects going on. Recently, Frank Sizer showed our future engineers how to hang a gate at the New Castle Murder Hole field entrance. It was truly a architectural masterpiece. Also a conservation trip was taken into New River. Be prepared to be volunteered to work on a new fence around Pighole when the weather becomes agreeable (weather must be considered outside of caves). Since I have been with the club we have not had any serious accidents anyone has admitted to. Let's not get careless. We have recently acquired some more rescue gear and will hold a practice rescue early winter quarter just in case.

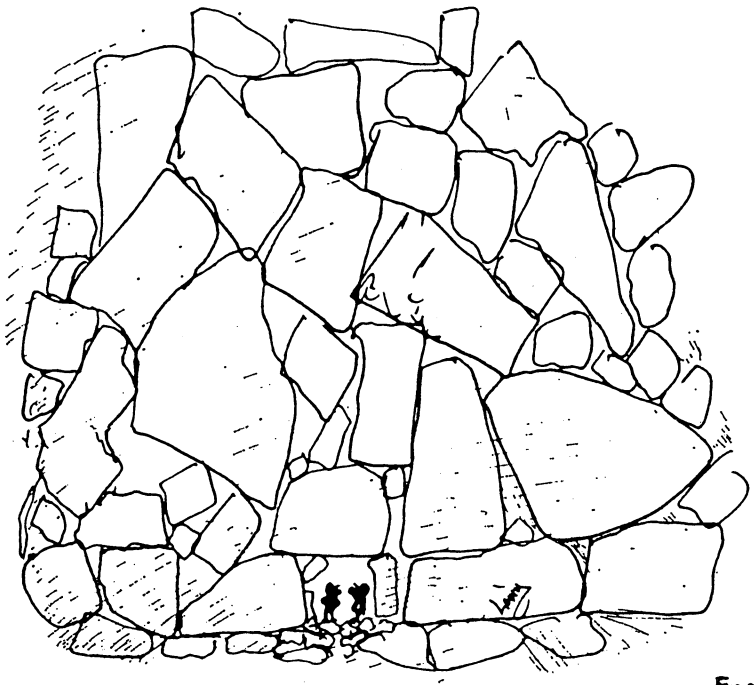
I'l like to tell the trainee's that you can learn more from the experienced people in the club, than from any book. Take advantage of them (yea!!) It's not hard to get free advice. Also, I'd like to encourage new members to carry their own packs, go up for club membership and support the National Speleological Society by becomming a member.

I would like to thank all of the committees for making things run pretty smoothly up to now. If you haven't participated, most committees would like to hear your opinion. Also, you too, can be a committee. See me if your interested.

Do yourself a favor.....take a trainee mapping.

From the podium,

Mark Honosky



I THOUGHT YOU WERE LEADING?

From:
My Daddy Was A Caver

Editor's Column

Well, after a long absence, I've made it back to VPI and to prove that history does repeat itself, I am again helping to edit the TROG.

Mike and I were determined to produce a good TROG and we'd like to thank the people who helped by contributing articles. As for the rest of you that are long over due to write something (and we know who you are), you will be hearing from us (Did you know that gravel and carbide look the same?!)

We are going to try to maintain a high level of quality in the future TROGS and are playing with some new ideas, (Maybe a color cover on a future issue) so you can look forward to Winter quarter's publication with anticipation. Keep up the good caving.

From: My Mommy Was A Caver

They tried to stop it, but we have freedom of the press on our side; they tried to boycott it, but people read it any way; so they tried to ignore it, but it kept comming back to haunt them. Its unavoidable, its inescapable, its anti-social, its the.....

grotto grapevine

Summer started out with a bang at convention and for a change, VPI had a good showing. Jerry Redder showed up with Gary Moss and Doug Perkins with Mark Slusarski. Lawrence Britt, Mike Futrell and Frank Gibson wandered out too. Maureen Handler even found her way up from Texas. Moose, Karen and Chad stopped in as part of a summer vacation and over the whole trip, their van cost more in repairs than it cost them to buy. Frank took 2 merit awards in the Photo Salon and Maureen won the 100' mechanical climb with a time of 54.5sec.

The summer months gave lots of good caving all around with good times to be had by all. CTR was a big success as usual. There was lots of partying, hot tubbing and saunaing for all as well as time to see all of those old friends from years gone by. The more wine party was a hit with cheap wine, cheap friends and a good loud horn. VPI was again well represented in the SpeleoOlympics as usual. Win Wright took 3rd place overall and a 1st in the PnP. Maureen got 4th overall and a 1st in the obstacle course. Keith Smith won the prussik contest and got another set of clog ascenders that he will probably never use. Ed Devine and Paul Kirchman won 1st and 2nd places respectively (never!!) in the Surveying contest. Janet Queisser took 2nd in the Cave quiz and we think Chuck Shorten won something too but no one can remember what. Jackie Redder fought a hard battle in the Old Ladies Contest. Doug brought his music for the party Sunday night which was enjoyed by all and the Absense of Daddy Don was noted by all. The Zo's showed up with a 33% larger family appropriately named DanZo. Don and Cheryl showed up again from Oman as well as Carolyn Lewis Grafton from New Zealand.

Maureen has moved back into town with 'hubby' Alec. Keith is living in sin with Dave Consavich; RH signed in (probably by accident). Boo and Theresa tied the knot. Psycho hasn't been seen with the same girl twice for one of two reasons. Rick LaCourse and Suezel got married and Rick is hosing around Blacksburg selling vacuum cleaners while Sue finishes with school. Jim Washington is watching MTV in Richmond and is caving with RASS (I didn't know RASS caved, I thought they played BINGO). Hillary has moved to the Huntsville area and is busy with her new job and is looking forward to doing some of those Alabama pits, she reports that her apartment is nearly caver proof and is expecting us Spring Break. Garrie Rouse is contemplating the real world and middle age and has given up Tazwell Co. for Monroe Co. Pat and Chuck have moved to Clemson so Chuck can

work on his PhD. Frank has had photos on the NSS News twice now. Mike and Lawrence have entered the wood working business together. Paul Soboleski's two additional waterfalls in New River Cave were actually in existance but they disappeared the the people on the trip stopped pissing. The club has been threatened to be evicted from the meeting place again due to excessive noise during programs and drinking beer in the parking lot.

A number of members (and some trainee scum, too) showed up at VAR, which was held at Friars Hole Cave Preserve. There was a keg party held Saturday night in Snedegar's complete with music and candles for a quarter mile into the cave. Bridge Day was again held at the New River Gorge Bridge with AR, Maureen, Jim Washington and Alec Villagomez going up (and down) for the festivities. This was followed by Lawrenced Oktober Fest which was a huge success including a showing of Das Boat and the killing of 3 kegs.

Halloween was held at Turner beach with some of the best costuming ever seen at a VPI party. Prizes were given to Keith for his hiking boot with Mike Futrell comming a close second with his Jumar. Boo, for his wonderful make-up on himself as well as AR, John Klein as the Samurai Caver, Garrie Rouse for a wonderful look at the future. And the best couple was Father Hugh and Sister Dave. And of course Becky with the best Hair-do. We also had a well dressed panel of judges this year.

Now for a progress report on some of our surveying projects. Lawrence says Starnes will be finished with "Just one more trip". Mike Futrell is progressing nicely in Wilburn Valley and the Zo's are still plugging along in Newberry's. Garrie Rouse has over 2 miles in Ellison's in Tazwell Co. Craig Fergusson is mapping in Aunt Nellie's and Jack Kehoe drives 5½ hours nearly every weekend just to go Surveying with the Rouse and company. And a number of people have been going up to West Virginia regularly on mapping trips. Lots of trainee trips have gone out and the new members are finding out that we are really as weird as people say we are.

Now we're all looking forward to Winter Quarter and lots of good caving and Ridge walking in the snow. Keep up the caving and let's be careful out there.

RETURN TO THE POLER REGIONS-
PAUL PENLEY CAVE

by Ed Devine

It was July, 1983, and we were back to Diddly Dome in Paul Penley Cave, Bland Co., Va. to finally scoop booty. Six months before, after nearly two years of frequently exciting effort which culminated in a scaling pole climb at the top of a bolt climb 80' above the floor of the dome, Chris Welsh had finally rigged a rope up the dome so that return would be easy. We decided to name the region at the top of this dome The Poler Regions if it went anywhere.

The crew on this trip were Diddly Dome veterans including Joe Zokaites, Chris Welsh, Ed Devine, Miles Drake and the ever resourceful Cliff Briggs. After about 5 hours of hard travel from the entrance, the crew reached the Ante Room where the technical work for the dome climb was organized and where the Sherpa support crews had spent so long waiting during previous trips. From here a tight crawl leads 15' to the belay alcove where a tight, floorless chimney leads out into the dome about 75' above the floor. From here a caver could look up into waterfall spray toward the top of the dome where Chris's goldline rigging leads to its anchor at the start of the leads 30' above.

Before climbing the dome, however, we had to get the scaling pole off the wall where it was still rigged from the previous trip.

In a lightweight wetsuit, I re-climbed the bolt climb and started de-rigging the gear. All went smoothly until the pole was ready to lower. The pole weighs about 30 pounds with attached gear but is awkward to handle for one person hanging on a wall. The pole had been on the wall for about 6 months and steel parts showed a little rust but generally looked good considering the constant rain falling on them. I pulled the pole down and had the top hanging off my belay seat with a length of cord. The idea was to transfer the pole to a longer rope that lead from me down into the belay alcove where the other cavers would reel it in as I lowered it.

Everything appeared ready. I thought the top of the pole was clipped into the lowering rope. I untied the pole from my seat and dropped it about a quarter-inch to take up slack on the lowering rope.

With shock, I stared as the pole fell and vanished from sight below. In brief panic, I was sure I had clipped onto the wrong end of the lowering rope and I expected the full 30 pounds of the pole to yank the line after falling 40 feet or so. Would my belay seat or the bolts from which I was hanging take the impact!?

With a loud crash, a wave of relief passed through me as I realized that the pole hadn't been tied at all and had speared into rocks on the bottom 80' below. This was followed immediately by a feeling of frustration as I considered the destroyed pole at the bottom and the special trip that would be required later to retrieve it. At least we wouldn't have to carry it out this trip! I yelled my OK status to the guys below who couldn't see a thing but had heard a lot of noise.

I climbed down the bolts, derigging as I went, and prepared to climb the goldline Chris had rigged earlier.

It had taken Chris 4 hours to rig an anchor at the top of the dome once he got up there. Natural anchors were non-existent at the top where an unstable sandstone rubble slope continues upward. A tight stream canyon enters the top of the dome through a voice-only connection to the top


EAD
84

of the rubble pile and with great difficulty, Chris rigged around and through this connection with about 75 feet of rope and sling to establish a very stretchy anchor with lots of unseen, uninspected rub points.

With these thoughts in mind, I gingerly climbed the goldline and was soon standing safely at the top of the dome preparing a new anchor.

The rock is terribly shaley and crumbly at the top with the only good bolting spot being the bedrock floor in the stream at the lip of the pit where rockfall and water are ghastly. This wasn't seriously considered.

We had brought a 3' length of steel angle from a scrapped power line tower to wedge into the canyon at the top of the dome. I pulled this up from below and rigged it like a big chock and soon had a belay and cable ladder rigged to it. We had also brought along an 18-inch aluminum angle beam chock which was rigged as a backup to the steel one which was also tied to the goldline. We anticipated many trips and this is a bombproof anchoring system which should last for many years.

Reducing the splash and spray from the waterfall was the next job to tackle. Chris and Miles had constructed a 10' x 3' plastic spray curtain with grommets at the top and corners for rigging. I pulled this up and draped it across the stream at the top so that most of it hung below between the water and the cable ladder. Most of the water that had fallen on the bolt climb like a continuous light rain was now deflected harmlessly to the opposite wall. The bottom of the ladder, where it lead back into the belay alcove in a "J" shape, was still in the splash but with speed, a caver could reach the top largely dry. An electric backup headlamp was still needed, however. The spray curtain was lashed to finger-sized pebbles which I wedged into cracks and crevices around the lip; amazingly, the thing has held and is still there after a year and numerous rock falls.

With all tasks completed, Chris and Joe did the ladder climb with belays from me at the top and Miles in the belay alcove, below. Miles, who didn't like the look of the rigging, exposure, and water decided to wait below while we explored and surveyed. Cliff Briggs, who was investigating a potential sump-dive in a nearby lead, also decided to wait it out.

In Paul Penley Cave, we always map as we explore. We try to stick to a policy of exploring no more than 50 feet without surveying in order to eliminate the occurrence of unsurveyed leads that nobody wants to come back for.

When I had first climbed the dome, several trips before Chris got it successfully rigged, I explored about 150 feet and quit at a junction room with several good leads off it. I was sure at the time that these leads were heading east toward Buddy Penley Cave and Newberry Cave which lie less than a thousand away from the top of dome in that direction. This looked like a real hot connection lead.

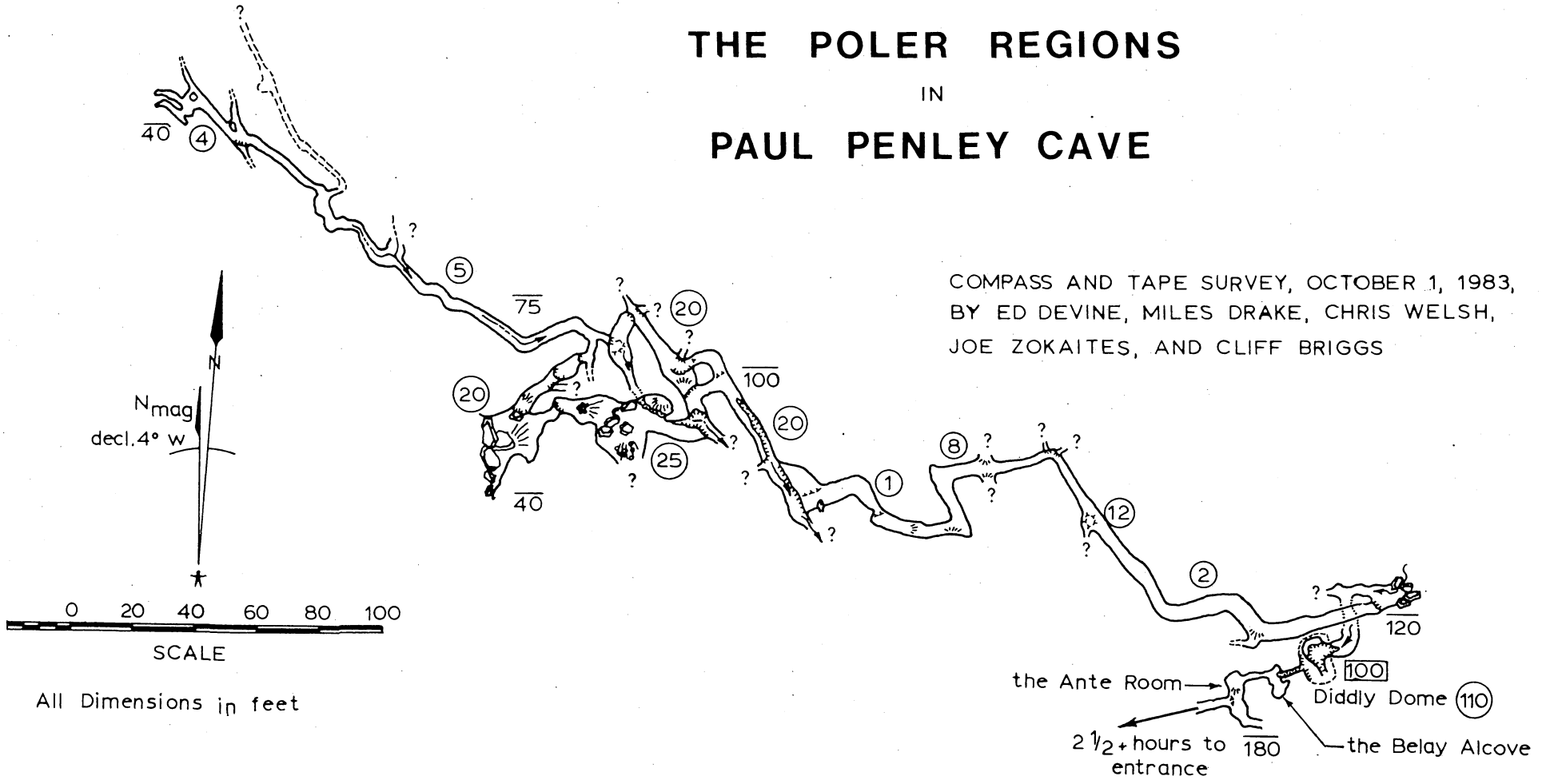
We surveyed up the scary rubble slope, observing how lethal several of the boulders looked, and soon reached the crawl lead we had found previously. As we started surveying this lead its westward trend, away from the other caves and back toward the Paul Penley entrance, was evident. We made rapid progress in this low passage and soon reached the junction room where I had stopped previously.

We continued down the largest lead which was a 2' wide and 8' high walking passage that went around a bend and opened into a pleasant junction room with a phreatic "balloon" for a ceiling. In this dry spot we changed out of our wet clothes into dry ones we had brought and continued westward in an extension of the same tube that had started out as our crawl

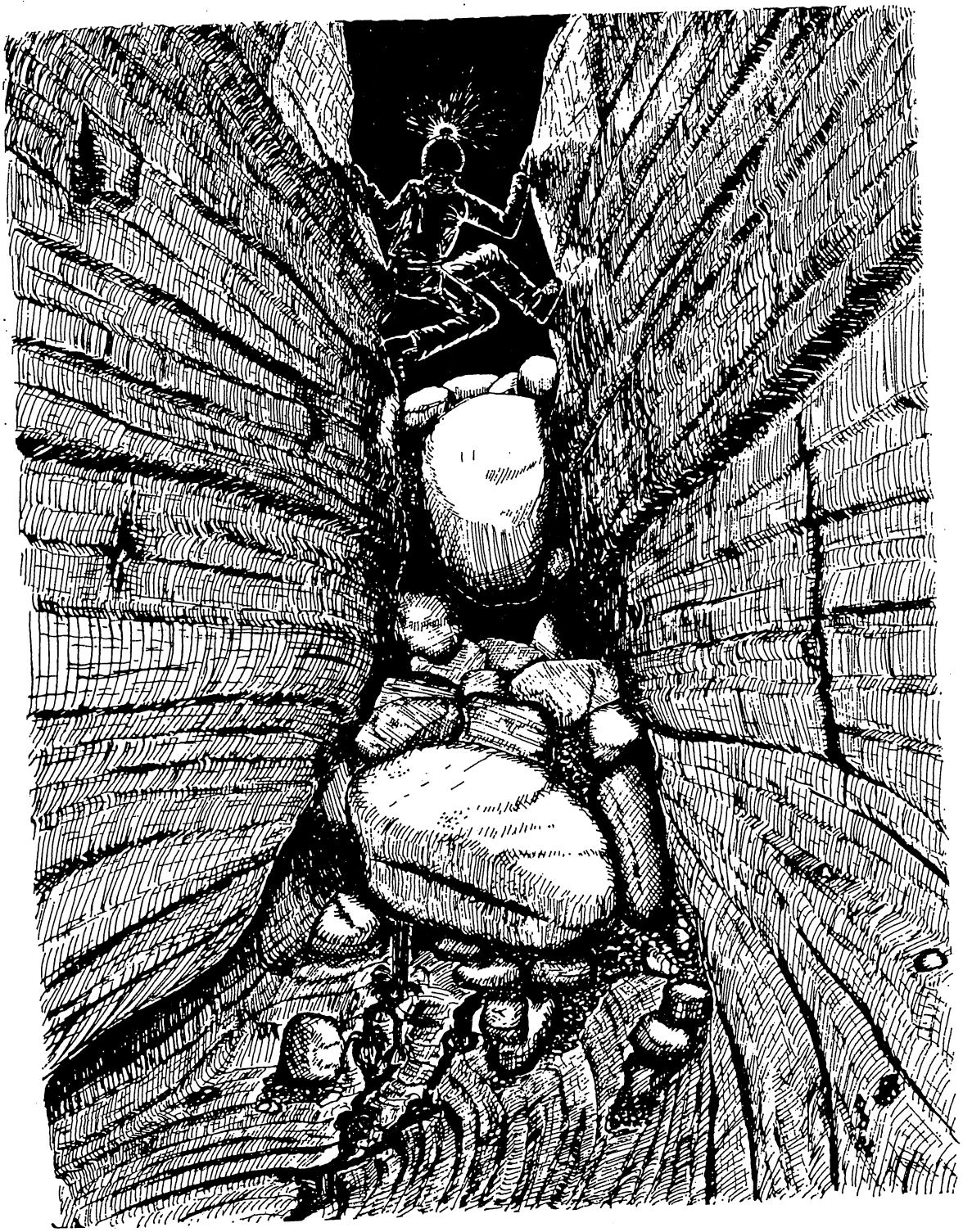
THE POLER REGIONS

IN

PAUL PENLEY CAVE



COMPASS AND TAPE SURVEY, OCTOBER 1, 1983,
BY ED DEVINE, MILES DRAKE, CHRIS WELSH,
JOE ZOKAITES, AND CLIFF BRIGGS



lead at the top of the dome. Numerous spacious side leads opened out of this section, but we left these for later trips.

After passing through a 10-inch low spot, the tube ended in an overlook above a 20' high trickle stream canyon which we followed upstream, to the west, until it entered a major junction room about 20' high and 15' wide. This room had another intersecting trickle stream canyon, numerous high leads, a 25' dome with a trickle and a high canyon at its west end.

After enjoying a little supper, we tackled the westward canyon lead. Downstream it looked tight and nasty, but upstream we immediately entered a 25' x 25' x 30' room with massive sandstone rubble and breakdown at its western end. We surveyed steeply up and through this choke but could find no way through. The stuff had a distinctly surface choke look about it.

As we headed back, we pushed a tight, obscure lead to the left in the breakdown and popped into a steeply descending canyon in bedrock which soon opened into the side of a small trickle-stream canyon.

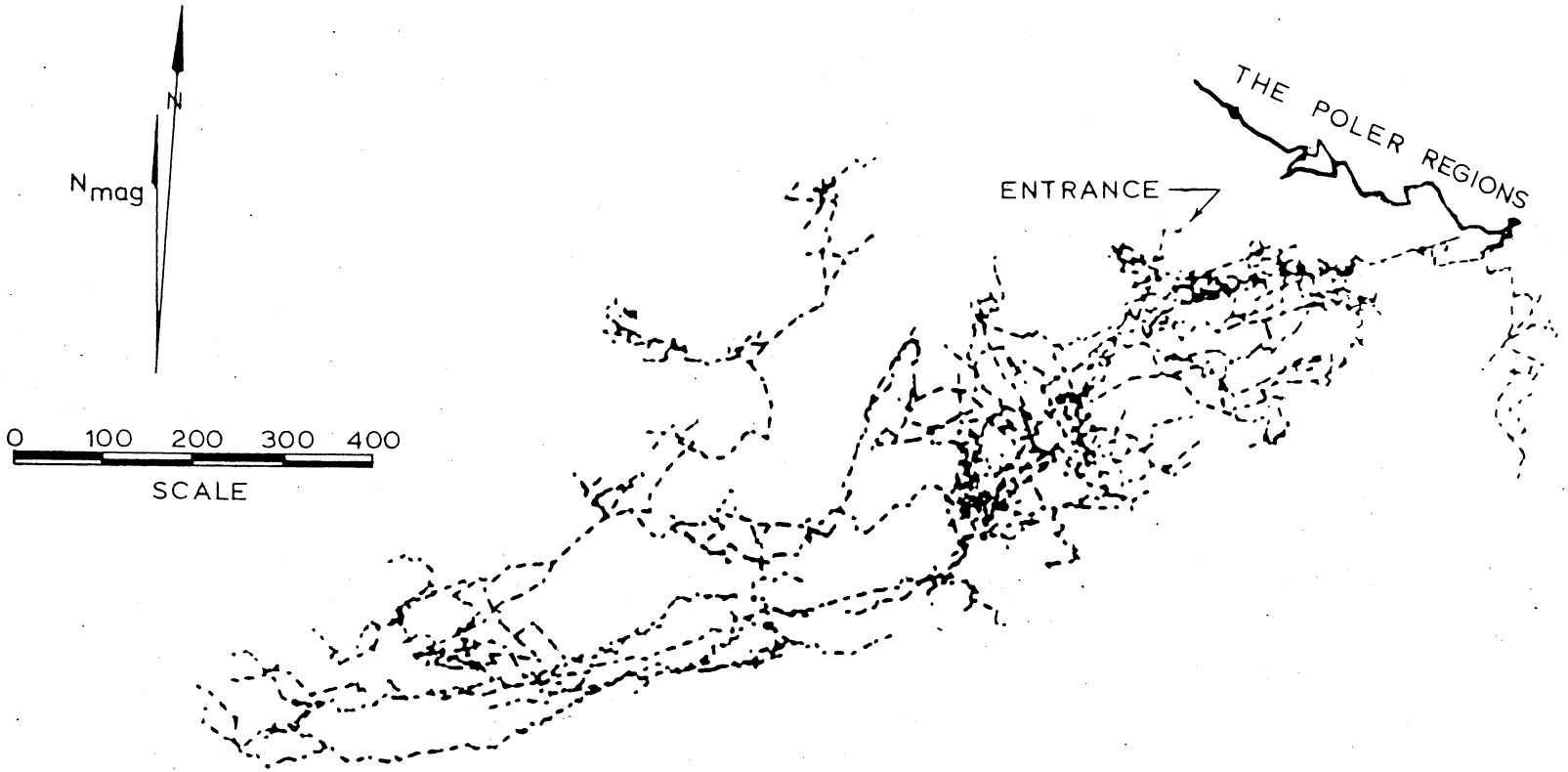
This lead 30' downstream to a 25' drop in the floor thereby eliminating a nasty climb up the 25' dome we had found earlier. Upstream, to the west, we surveyed several hundred feet of meandering stream canyon 6' high and 2' wide. This ended in sandstone rubble fill which again looked like surface stuff. However, we had about 3 or 4 tight canyon leads entering this passage so it still had potential. About this time we decided to head out. On the way out Joe pushed one of the leads about 50' and said it was pretty bad and probably ended. We knew we had some rough surveying ahead for the next trip.

The long trip out was tiring and scary as we climbed back down the ladder at the dome. We left the VPI Grotto ladder rigged at the dome figuring that the grief we'd catch for doing that wasn't as bad as having to reclimb the goldline. We caught up with Miles and Cliff who was finished with his sump recon and had started work on a tough dig which ended after 50' of digging through mud and gravel fill when a boulder choke was encountered.

After a long and tiring drive back to D.C., I plotted the survey data and discovered that our leads had ended near the surface not 100' from the main entrance to the cave.

Next: The Poler Regions opens up...

PAUL PENLEY CAVE SYSTEM; BLAND CO., VA.



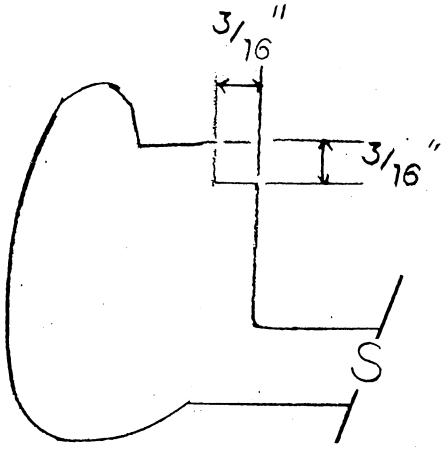
COMPASS AND TAPE SURVEY, JANUARY, 1978, TO OCTOBER, 1983, BY MEMBERS OF VPI GROTTO AND OTHERS

TOTAL SURVEYED PASSAGE 26300' (8018 m)

No Mess, No Fuss Stoves

by Paul Soboleski

While surveying with Mike Futrell and Frank Gibson in Wilburn Valley, I was blessed with having both cans of my Dinty Moore's fall off of my Butterfly stove. As a result of this incident, I thought there had to be a better way to heat food while mapping. I came up with this idea: Simply cut the innermost corner of each of the stove's legs as illustrated below. A hacksaw works better than wire snips, but takes longer. Wire snips tend to roll the metal edges over. The 3/16" cuts allow the food can to rest directly on the legs for support, rather than balancing the can on the rounded corners of the legs. Bon Appetit!!



A MEXICAN ADVENTURE

Shortly after the Old Timer's Reunion on '83, I left the next door caving of Virginia for the wilds of Texas and Mexico. After some minor caving in Oklahoma and Mexico (There are no real caves in Texas except for the Devil's Sinkhole (which is closed), Bracken Bat cave (which has 5 million bats in it), and a number of commercial caves) I was ready for my first real Mexican caving trip; six days of ridge walking, caving, pit bouncing and general spectacular sightseeing and partying.

The Tuesday before Thanksgiving, Mike Walsh, Bill Rupley, Al Ogden, Russell Dobson (all from South West Texas Grotto) and I left San Marcos and headed for Mexico. After driving all night, we reached Cuidad Mante and after breakfast we drove to a beautiful swimming hole where a spring comes out of a large cave entrance. The crystal clear water was a welcome sight and with snorkles and masks in hand we rushed for the water. After our little R & R, we drove south to Micos. Micos is a wonderful place, multi-level waterfalls abound of which the largest is about 70' high. After a short swim and a lot of food and beer, we turned in for the night. Around 10pm Blake Harrison and the Hog-of-Steel pulled in with a crew of 8. Thursday morning, after an hour or so of blowing up ant hills with carbide, 4 of us hiked to the uppermost falls (1500' vertical from the bottom). Behind the largest of these falls we found a shelter cave 30' wide, 6' high and 8' deep. It was great watching all of that water crashing down in front of you. At noon, we headed south for San Francisco (not the one in CA). When we got to town, we walked to Sotano de San Francisco and threw rocks down the 385'free drop and then drove off to find a place to camp 13 miles to the south. Going up a rather steep section of road the clutch in Mikes truck overheated but we finally arrived and made camp 1½ miles from Cueva del Puente. We had a simple but filling dinner in honor of Thanksgiving, while Blake and the Hog crew were some hours behind us enjoying roast turkey.

Friday morning, we awoke to the sounds of large machinery (in the middle of no where, Mexico??). After a little food, we wandered around looking at and for holes in the ground. Albert came back with tales of a water pumping station and they were pumping water out of an unrecorded pit for use in a nearby mine. After talking with one of the workers for a while, Bill and Russel decided to descend the pit (which the Mexican claimed was 1000' deep) using the ladders put in by the local workers. Albert, Mike and I continued ridge walking. We had a great time hiking around in virgin Karst and found a few interesting holes but nothing really significant. After an hour or so, we headed back to the pit to see what Russell and Bill had found.

On our return, they told us about climbing down 200+' and then, being soaking wet and tired, had decided to return

to the surface due to the unsafe nature of the ladders. We made camp above the doline where the entrances to La Puente are located. Mike and I continued our scouting around and in the doline looking for the main entrance to la Puente. After an hour or so, we headed back to the base camp.

Lo and behold, right at dusk, Blake and the Hog crew showed up and we geared up for a trip into Cueva de la Puente. The cave is large walking passage with many unexplored leads. Two of the leads are downstream water entrances. At the first there was a beautiful set of rimstone dams and in one of the pools we discovered a unique and beautiful formation. At first we thought it was some sort of cave biology, it looked like a white sea anenomae, but it turned out to be horizontally growing soda straws just under the water surface. At the second water lead, I wanted to push upstream because it was very possible that this stream was the one the station was pumping from. I talked Bill and Greg (Hog crew member) into coming with me and we took off up stream while everyone else stayed to look at some more formations. The 3 of us kept walking upstream through large, wet, walking passage. I proceeded to fall in the water twice and once nearly drowned with my heavy boots until I discovered that the water was only chest deep. After pushing for about 1000', we came to a low spot and had to crawl, then the passage opened up again and we were able to walk. Now the passage was full of beautiful, clean, unvandalized formations. We were awe struck but also wet and tired. At our next rest stop, we decided to turn around and give up looking for the connection, when suddenly, Bill yelled "Hey, What's That??!" As we looked where his light was shining down the passage, there was a section of ladder and 10" pipe. We were ecstatic, we had found the connection. We went on and climbed up the first couple of ladders and when we looked up, a large part of the ceiling was covered with 2 & 3 foot long soda straws. At the far wall we saw ladders going up in a waterfall through a big, black hole in the ceiling.

We then had to decide whether to try to climb the pit (which for all we knew was 1000' deep) or to go back the way we had come in. Bill was the only one familiar with the ladders and he said he wanted to go for it, so we decided to try. We had to climb 20' sections of 2" angle iron ladders while hundreds of gallons of cold water was pouring on us from the pump overflow. Bill and Greg had electric lights, but my carbide lamp soon became useless, and I had to proceed with only a flashlight which I held in my teeth as I lead the way up. The ladders were ingeneously rigged for Mexican technology. 2 1½" diameter bars were set into the walls about 2½' apart. A wooden or metal sheet served as a platform. The ladder's base was resting on this platform while the top of the ladder was held onto the next platform by baling wire. Most of the ladders were fairly sturdy but a few of them were nerve shaking.

We counted a total of 25 ladders plus some free climbing. We then estimated the total depth at 600+ feet, with a total of 3 pits. Two of about 200' and one about 100' deep. When

we came out we were so thrilled with what we had accomplished. We had added 1000'+ to the known cave and were the first to make the connection (as far as I know the only ones so far). As an added plus (aside from being even more tired and soaked to the bone) we beat everyone else out ot the cave.

Bright and early the next morning, our crew in Mike's truck took off for Jalpan and Ahuacatlan for some yo-yoing. I was finally going to get to do some Mexican pits. The scenery was beautiful on the way to Jalpan and the drive uneventful, however, this was not to last.

Mikes truck, which had been acting up on the way to San Francisco, was now behaving worse than ever. It really did not want to be climbing that mountain. Soon we could all smell gas and that was the first major sign of trouble. Suddenly Albert yelled "FIRE!!" as flames started shooting out of the floorboards. We all piled out of the truck and threw a chock stone under the rear wheel. We opened up the hood and there were 3 & 4 foot flames shooting out of the engine. After failing to put out the fire with everything from water to beer, we realized our best recourse to get our gear out before it was too late to salvage anything. By this time the fire had burned through the fuel line and everything not make of metal under the hood was melting. We got all of our gear out and all we could do was watch Old Blue burn. Suddenly, some thing gave way and it started to roll, right off the side of the mountain. For an old truck it took the fall well, but it had reached its final resting place. At this point, we started wondering how the hell we were going to get home, We were 1000 miles from Austin!! We paid a passing Mexican in a Pick-up to take us and our gear to Jalpan. We dropped Albert and Russel off at the road to Puente de Dios to meet up with Blake that night and the rest of us went into town. We stayed the night in a hotel with our mountain of gear and awaited our rescuers. The next morning, Albert and Russell showed up and told us that Blake hadn't shown up at our designated camping spot, so we sent Bill to Xilitla in hope of finding them at the Bird House. A few hours later, Mike and I hopped on a Chicken bus to Cuidad Valles to start the police and insurance agent on getting the truck papers organized. During our bus layover in Xilitla, we met up with Bill again and he said that he had found Blake but they didnt have tome to rescue our gear and they had taken off for the States.

Mike and I stayed the night in Valles and awaited Bill, Russell and Albert at which point I was going to return to the US with Russell and Albert, while Bill stayed with Mike until the papers were straightened out. When Bill found us in Valles he was alone, explaining that they had arrived in town only 10 minutes before the next bus to Monterrey was leaving, and Russell and Albert had decided to catch the bus instead of waiting for me. So now I had to travel 700 miles through Mexico by myself. What an adventure. I nearly got dumped in

Monterrey at 4:30am, but was successful in catching my connection. I arrived at the border at 8:30 am. 60 hours after the accident. But, I was safe and sound and back in the US of A!!

Mike and Bill showed up three days later and I went to the border to pick them up. A month later Russell and I returned to Jalpan to rescue $1500 worth of gear we had to stash and I finally got to bounce those pits.

Maureen Handley

THE PHANTOM BARTENDER STRIKES AGAIN!

My First Cave Trip

When one considers that the closest thing to caving I had done was snow tunnels in my native Connecticut, I should never have asked, "What's Caving?" However, that was how I discovered my girlfriend was (gasp) a Caver! Up to that point, she was just someone to talk to while watching submarine races in the New River. Suddenly I had to join her on this "Quest For Mire." Feigning enthusiasm, I agreed to the pre-death burial rite.

Of course, where does one take a Yankee Tourist on his first caving rrip? Certainly nothing vertical (a lovely euphemism for DOWN) and nothing too macho. Perhaps a Nerd cave. Not quite, We went to Smoke Hole.

I was told to be prepared and prepared I was; a full change of clothing, old boots and borrowed helmet and lamp (thanks guys). I would have brought my scuba gear and Rubber Duckie if I had known what was meant when I heard the words, "By the way, this is a wet cave". I was warned I would get my knees wet and they were.

The way into Smoke Hole is not difficult but not insulting either. There is a mild chimney and a nice "break-down" room (Do it break often?). There were several passages with water in them and my knees got wet. I now felt I had seen the worst this cave was going to throw at me and went on convinced that caving wasn't so bad.

In the back of Smoke Hole, is a vast room about 150' X 60'. The biggest hole I'd seen before was the IRT Uptown in NYC and this one didn't have drunks in it (another misconception). We played in this room for a while and then started back. That was when it happened. Some one said "Let's take the Water Exit!"

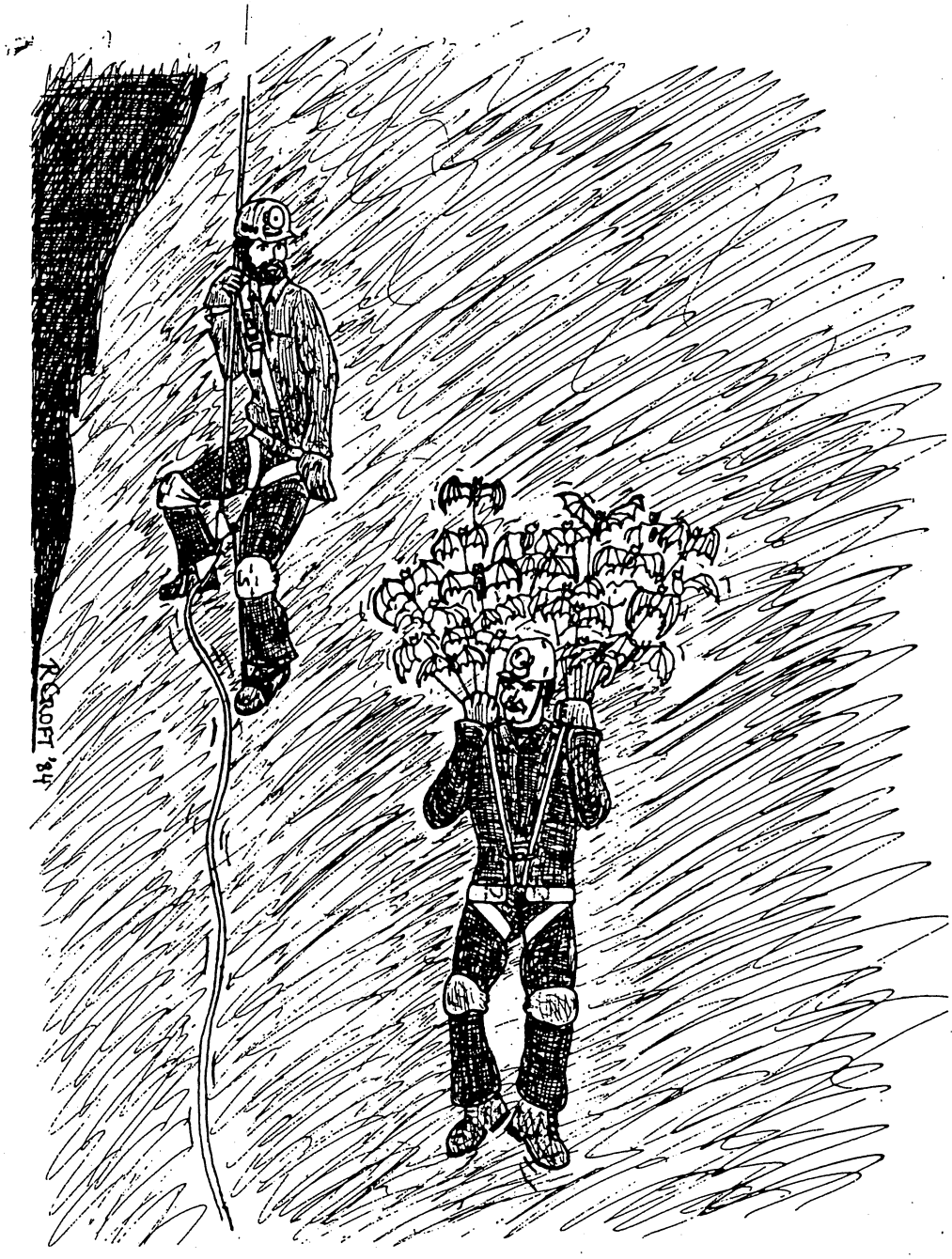
Being lead down the path of doom, I wandered on, not knowing what fate (and some clown) had in store for me. I didn't see the Water Exit until it was too late, Half of the group was already through. For those of you who are unaware, the first part is an exhilarating step into a small 5' deep pool with a 7' long 'Duck Under'. Duck-under is another quaint phrase cavers use. It means, "there's air, but a duck couldn't swim under it. Well, into the pool I went (such a good sport). Feeling like a new member of the Polar Bear Club, I went under the duck and came out on the other side only to discover that I was now in a river that went as far as I could see. Of course, you can't see beyond the next duck-under. This is when unhappiness set in only to be replaced by depression further on. They told me there was air all the way through this duck but I was too numb to tell. I held my breath and swam through.

It is normal to take a deep breath of air when one emerges from water, and being fairly normal, I did just that when I came up. It was then that I realized I was swimming in a pool with a large sheep at it's peak of ripeness. The splender

and aroma of Mother Nature's ways were not lost on me; however, there above me was what I most craved, DAYLIGHT!!

Surviving this ordeal, I later went on to marry the person responsible for it, specifically one "Chew Weassel". Having assumed the trappings of domicile life, I can now look back at my experience and reflect upon the lessons learned: 1) Never trust a caver who calls you "Honey-Bunny". 2) Always go out the way you came in. 3) Don't Go In!!

Rick LaCourse



SKYDUSKY HOLLOW PHOTOGRAMMETRIC MAPPING PROJECT

BY

HILLARY C. MINICH

Virginia Polytechnic Institute
and
State University

October, 1984

ACKNOWLEDGEMENTS

The success of this somewhat challenging project would not have been possible with out the help of the friends and associates whom i would like to recognize and thank. Dr. Steven Johnson was my advising professor on the project; Matt Swanson, Charles Wagner, George Bryant, Cass Camp, Mike Gaydosh, Bill Ware and Professor Harlan Onsrud, helped establish the necessary photo control network; Mike Gaydosh, John Lohner, Richard Cobb and Pat Nickenson helped run the spur traverses up to the cave entrances; and Mike Gaydosh spent many hours at the plotter table assisting me in the compilation of the map.

The class members also wrote reports on the photo control project, which I used extensively in writing that section of the report.

I would also like to thank the Landowners of Skydusky Hollow for their never-ending cooperation, hospitality, and patience.

CONTENTS

INTRODUCTION

This quasi-technical article was written to give the average caver an idea of what was involved in making the topographic map of the Skydusky Hollow area in Bland County, Virginia. Being hard-pressed to define the "average caver" I aimed at some one with little or no knowledge of surveying above ground or photogrammetry, but included just enough technical information to make it interesting and fulfill by degree requirements. I hope you enjoy reading it as much as I've enjoyed working on it; it is, after all, my ticket out of here.

ORIGIN AND PURPOSE OF THE PROJECT

Every project needs a reason to make it all worthwhile; this one had several.

Skydusky Hollow contains the largest known cave system in Virginia and is perhaps the most popular caving area for the VPI Grotto of the National Speleological Society (NSS). The system is comprised of eight caves: Spring Hollow, Banes Spring, Bane's, Newberry's, Buddy Penley's, Paul Penley's, Harman's Avalanche Pit and Coon. For the past 20 years, grotto members have been surveying, dye-tracing, and studying the geology and biology of the caves.

Approximately 20 miles of passage has been mapped thus far, but many miles of passage still need to be done.

Karst areas, like Skydusky, are known for their caves and sinking streams. This means that much of the water does not run above the ground but under it, putting farmers at a disadvantage during serious drought conditions. Using cave entrance coordinates on the topo map to orient the underground surveys, one could produce a bi-level map showing the underground streams in relation to the surface topography which would be useful to the landowners in the event of an extremely serious drought.

The bi-level map would also enable one to see, for the first time, the precise relative positions of the caves in the Skydusky Hollow system to one another.

At the time of the writing of this article, the topographic map had been completed and the three-dimensional (X,Y,Z) entrance coordinates had been given to Ed Devine, the keeper of the underground data. He is working on the underground part of the bi-level map.

The need for an entrance location/topographic map has been apparent for many years, the problem was figuring out how to best make one. Skydusky is too large and mountainous an area to realistically attempt a Brunton or Suunto and tape mapping project, as a few cavers discovered the hard way. I decided to use my connections as a Civil Engineering/ Surveying major to try to attack the problem with some serious equipment.

I went to Dr. Johnson, head of the Geodetic engineering division in CE, in February, 1984 with my ideas saying Skydusky was a "classic, textbook, surveying project." He said that it had potential as a project for the summer class, but that there would never be enough time to traverse to all the cave entrances, which would basically have defeated the whole purpose of the survey. He also expressed concern about the possibility of inquisitive cavers nosing around all of his valuable equipment once they realized its potential. Smart man.

The solution he suggested was analytical photogrammetry, which happens to be my area of special interest in surveying. If I could find sutable metric aerial photographs of the area, he would consider having the summer surveying lab (CE 4420- Applied Surveying Problens) establish the control network necessary to interface the photographs and a stereoplotter so that I could compile the map photogrammetrically as an independent study project. The proposed map began to look more and more like a reality.

PROJECT PLANNING AND RECONNAISSANCE

Metric aerial photography used in analytical photogrammetry is taken with a precisely calibrated compound lens aerial camera. It is "flown" in strips and the date, time, scale, and other data necessary for precise measurement are directly recorded on the image itself. This type of imagery

is available from the state and federal governments if they happen to have flown a project in your area of interest. If not, you can contract an aerial photography firm to fly the area for you to your specifications but at considerable cost.

I spent spring break looking at the Federal imagery at the National Cartographic Information Center (NCIC) in Reston, Virginia, and the Virginia Department of Highways (VADOH) imagery in Richmond. The best I could find was two sets of photos (stereopairs) taken by the VADOH on September 15, 1971 at a scale of 1:16,800 (1"=1400') at an average flying height of 8409' above the terrain. These photos had some major drawbacks: the trees and vegetation were in full leaf, making impossible to contour up to and locate the cave entrances photogrammetrically; the mapping area was in a corner in both sets of photos, making them harder to interface accurately with the stereoplotter; the area was remote enough that there were no nearby control points (points of precisely known geographical position), so that we would have to survey in all of the control ourselves; and that I would essentially be making a 13 year old map because of the age of the photography. I decided to ask the club to finance flying the area. This did not go over too well; they didn't like the considerable cost part so I had to go with the photos that already existed. They did agree to subsidize the purchase of these. Professor Johnson and I estimated that I could make a 10' contour interval map at a scale of 1"=300' from this imagery, which was adequate for my purposes.

The next step, after the imagery, map scale, and contour interval were decided upon, was to do some reconnaissance, and determine the most efficient way to go about establishing the necessary photo control network. Joe Zokaites and I talked to all of the landowners to get permission for the class to survey on their land. They were all very agreeable. I then arranged for Professors Johnson and Onsrud, who would be teaching the summer class, to come out and look at the area to get an idea of what they were going to have to deal with. We finally ended up making the trip on the morning of the VPI Cave Club Picnic.

After talking to Buddy Penley for a while, checking lines of sight, distances, and photo-identifiable points, having my car bottom out and die on the way up to the Buddy's entrance and realizing that this project would probably eat up most if not all of the summer lab's travel budget, they concluded that it would be a real challenge. That, however, is the idea of the summer lab anyway, so they approved the project and left before the beer and most of the prople got there, fortunately for them, I guess.

SKYDUSKY HOLLOW PHOTO CONTROL PROJECT

Introduction

A network of points of known geographical position is called a control network. There are basically two types: the vertical network, in which point elevations with respect to a given datum are precisely known, and the horizontal network, in which X and Y point positions with respect to a given coordinate system (i.e. Virginia State Plane Coordinate System or Latitude and Longitude) are precisely known. A point whose position is precisely known in three dimensions may be simultaneously included in both horizontal and vertical control network. If the points in a network are photo-identifiable (recognizable in the aerial photographs) and the spatial distances between points are computed, they can be used first to orient and then make measurements on the stereoplotter. This network is known as photo control.

The members and instructors of CE 442o-Applied Surveying Problems, the seven credit summer surveying lab, established the photo control as one of their projects. Their objective was to survey enough horizontal and vertical control in three days to enable the orientation of the two stereomodels of the area and the subsequent compilation of a 10' contour interval topographic map at a scale of 1"=300'.

Control Specifications

The following minimum horizontal and vertical control requirements were specified in order to enable the fulfillment of the mapping objective:

HORIZONTAL CONTROL:

1. A minimum of three horizontal photo control points near the edges of the mapping area in each stereomodel.
2. Points clearly identifiable (i.e. a prominent rock, power pole, fence or house corner) and also photo identifiable if intended for photo control use.
3. Distances reduced to ground scale.
4. Solar azimuths to orient the survey to true North.
5. Photo control points located to a minimum accuracy of 1/50th" at map scale, or 6' on the ground for a 1"=300' map scale. However, since the map scale had not been definitely specified at the time of the survey, the points were located more accurately than the minimum value.
6. Basic control 10 times more accurate than the photo control, or good to at least .6'.

VERTICAL CONTROL:

1. A minimum of four vertical control points near the edges of the mapping area in each stereomodel. These didn't have to be clearly point identifiable if the surrounding terrain was relatively flat.

2. Photo control points accurate to at least 1/5 of a contour interval, or 2' in this case. These were also located more accurately.
3. Basic control 10 times more accurate than the photo control, or good to at least .2'.

Establishment of Control

Control was established in three parts:

1. Basic Control consisting of monumented points set by a combination of triangulation and trilateration and double rodded leveling.
2. Photo identifiable control points set by coming off the nearest basic control point using side shots, spur traverses and trigonometric leveling.
3. Barometric leveling to obtain elevations to be used as rough checks in the plotter orientation process. Barometric levels (barometers or altimeters) use difference in barometric pressure to register difference in elevation. The weakness of this method is the assumption that the barometric pressure stays constant for an elevation. Although the pressure sometimes varied slightly, the elevations were accurate enough (+ or - 1.5') to be helpful in the initial part of the orientation, an interative process, for the 10' contour interval map.

Mountainous terrain, forrested land, and large mapping area size presented the class with new and challenging problems. Communication was usually only possible through field radios. Travel time was almost half an hour between some stations. Photo identifiable points were scarce, especially since the Highway Department photos were taken in 1971. Finally the shots were relatively long (some were over a mile). These physical factors and other problems such as only five people in the class, the project area being almost an hour away from Campus, and being allotted only three days to perform the survey, made organization and planning essential.

Four of the people in the class spent the first day with a Path automatic level and two Philadelphia rods running a level "loop" down the two mile long gravel road (SR 608) that runs parallel to Walker Mountain. They used a technique called double-rodded leveling which provides redundant elevations, thus eliminating the need for backtracking, and takes much less time than conventional leveling procedures. Professor Johnson called it fly leveling because, he said, we'd have to fly down that road to get it done in one day. He was pleasantly surprised at the end of the day (about 7 P.M.) when we told him it was done. The finished loop included temporary benchmarks along the road to be used as vertical control points, and two USGS control points located at road intersections to be used to orient the vertical control for the project to mean sea level.

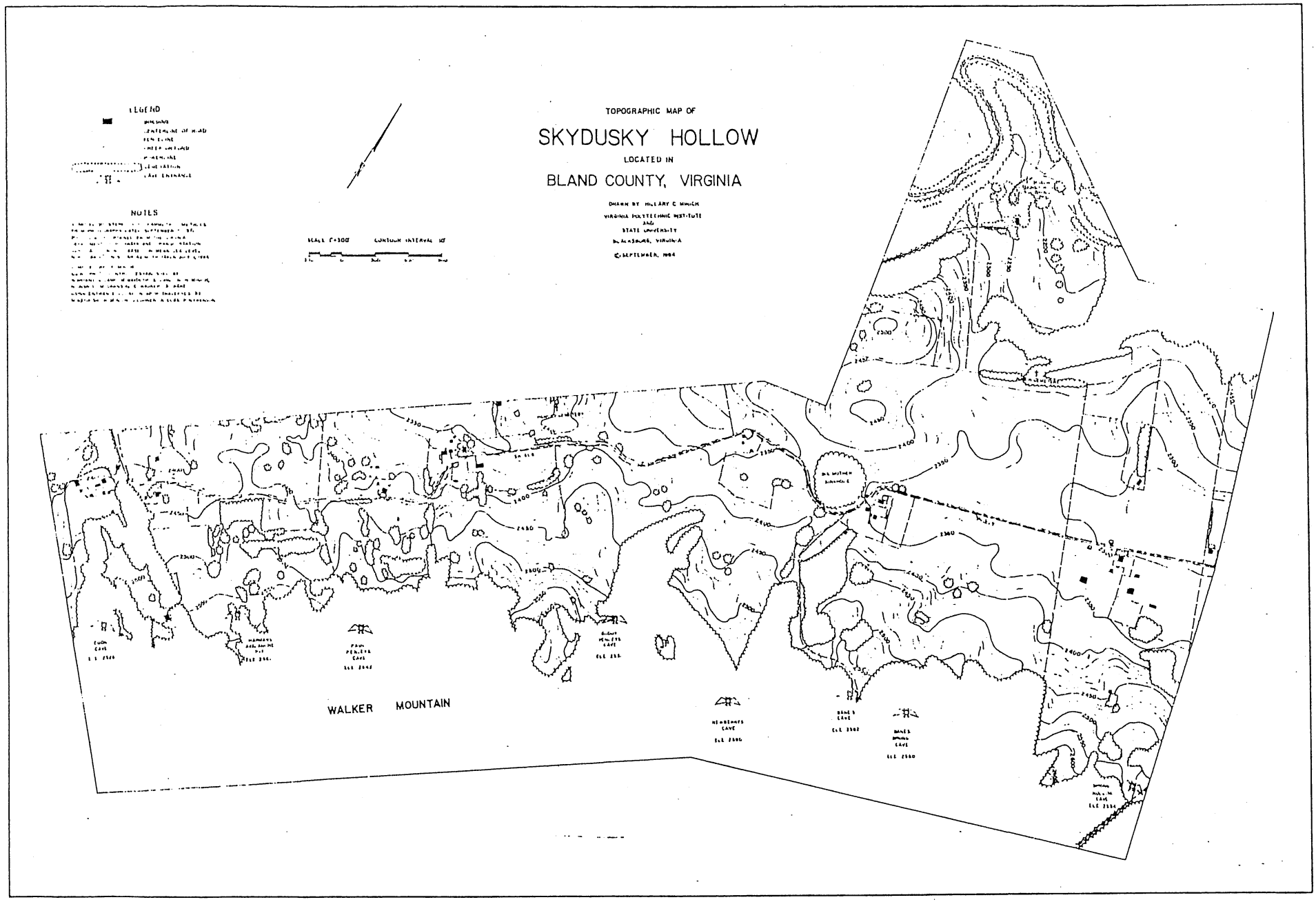
Dr. Johnson, the Teaching Assistants, and I (Party Chief), did reconnisiance work and decided where to locate the basic control network, the backbone of the horizontal control used on the project. It consisted of three stations (A,B,C) set on hill tops from which the road and all the photo control stations in front of the caves were sighted. The Teaching Assistants and I then picked out one photo-identifiable point which was near to each cave entrance as possible but still visible from two of the basic control points.

The desired result of this careful point location planning was the ability to carry elevation from vertical control points along the road to points A, B & C and then from those three points to each of the photo control points near the caves. Ideally, this would be done by occupying A, B & C to measure angles and distances to the control points and then computing the elevations trigonometrically. Horizontal positions would also be computed trigonometrically, with point B being arbitrarily assigned coordinates of 10,000, 10,000 since only the positions of the points relative to each other were desired. At least two positions and elevations would be computed for each point and then averaged. This procedure was followed as closely as possible, with some minor variations necessary because of the mountainous terrain.

The second day was spent occupying the three basic control points to turn the angles in the network and take sun shots, and barometric leveling. The Ziess Th-2 and Kern DKM II-AE, both 1" theodolites, were used. At least four horizontal and two vertical positions were taken at each station; any position containing an angle over 5" from the mean value was rejected and re-turned.

The azimuth of a line between two of the basic control points was used to orient the horizontal control network to true North. We determined the azimuth from the altitude of the Sun measured using theodolites fitted with Sun filters. This method requires observed vertical angles to the Sun corrected for refraction and parralax; the appriximate latitude of the observer which we scaled from a 7.5" USGS quad map; the time of observation, which we recorded from a wrist watch; and the position (declination) of the Sun, which we obtained from an astronomical almanac.

The last day in the field was used to measure the distances in the network using Electronic Distance Measuring Instruments (EDMI), and more barometric leveling. The EDMI we used, the HP 3800 and the Kern DM500, measure distance using precisely modulated laser light which is generated by the instrument, bounced off of a reflector on the station sighted back to the instrument, and compared to an internally reflected reference beam. The phase shift of the returning beam is measured and displayed as a distince on the instrument's digital readout. A different wave frequency is used for each magnitude of distance measured. The Teaching Assistants supervised the EDMI operation, while Mike Gaydosh and I ran the reflectors and tripods overland from entrance station to entrance station since we were the most familiar


LEGEND
NOTES
TOPOGRAPHIC MAP OF
SKYDUSKY HOLLOW
LOCATED IN
BLAND COUNTY, VIRGINIA
DRAWN BY HILLARY C MINICH
VIRGINIA POLYTECHNIC INSTITUTE
AND
STATE UNIVERSITY
BLACKSBURG, VIRGINIA
©SEPTEMBER, 1984
SCALE 1"=300'
CONTOUR INTERVAL 10'
WALKER MOUNTAIN

with the area. Now I know what a pack mule feels like, except he has four feet.

After completing their assigned part of the fieldwork, the class reduced the data and performed a least squares adjustment of it by computer. The network stations and corresponding error ellipses were then plotted by a Versatec plotter.

The end result of the project was the precise position of each of the points in the photo control network, an essential part of my independent study project. The class had met its objective. Now all that remained was for me to meet mine.

COMPILING THE MAP

Introduction

The objective of my independant study project was to photogrammetrically compile a 10' contour interval map of Skydusky Hollow at a scale of 1"=300' showing the eight cave entrance position, and write a report describing the process.

Much more in involved in compiling a map than the actual plotter work itself; before beginning the compilation one must some how obtain the imagery and required photo control. These steps were described in the preceeding sections of the report. The remaining sections are dedicated to explaining the stereoplotter and entrance location work.

The Stereoplotter

The stereoplotter used to compile the map is a 1950's vintage Zeiss C-8 Stereoplanigraph on indefinite loan from the Defense Mapping Agency. A first order instrument, it was one of the best of its day and is still one of the most accurate plotters in existence. It creates a precise stereo-model on which measurements can be made in three-dimensional space. This is done optically by shining light through a pair of stereophotographs printed on glass plates (Diapositives) which are mounted in stages. The right image is transmitted to the right eye and the left image is transmitted to the left eye, through a complex optical train of distortion correcting Mirrors and lenses. This results in the optical illusion that the image-to-eye distance and eye separation (eye base) are much greater than they actually are. Thus, the brain senses the parallactic angle formed between conjugate images on the two photographs, it is tricked into artificial depth perception, and creates a stereo (three-dimensional) model of the terrain.

Precise measurements of the stereomodel are made with the help of a "floating mark"; a dot of light which appears to float in the field of view. The dot of light appears to lie exactly on the surface of the ground when the image is in perfect stereo. It appears to move above or below the ground and split apart with positive or negative movement in the

Z direction, provided by the plotter footwheel. Elevation is measured when the dot is exactly on the ground by means to be discussed later. The accuracy of the measured elevation depends on the precision with which the plotter operator can put the dot on the ground; an error greater than a few tenths of a foot is unacceptable. This is a genuine art which most find difficult and some impossible to master.

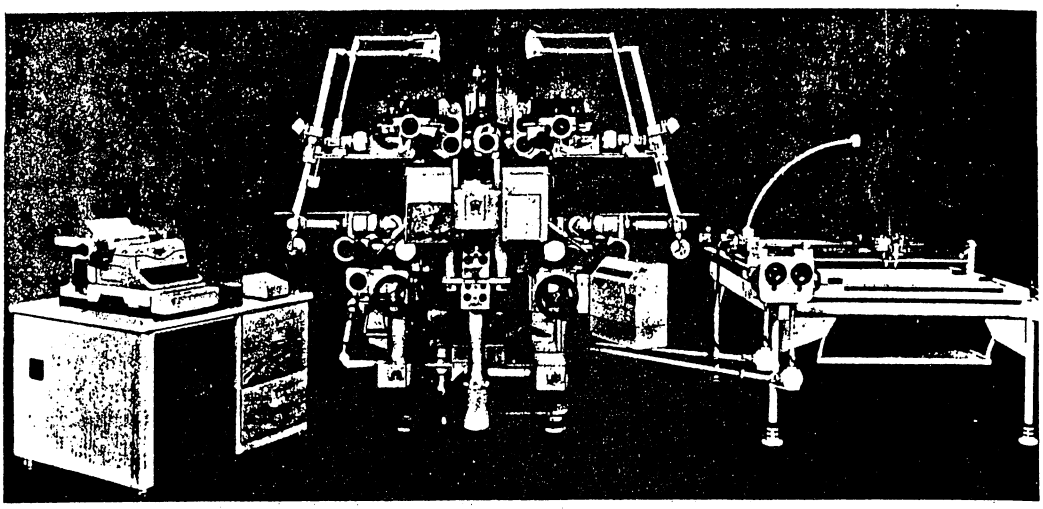


FIGURE 12-22. Latest Model C8 Stereoplanigraph w/Ecomat electromagnetic recording unit.

Orienting the Stereoplotter

Before the C-8 may be used, the diapositives, plotter and plotter table must be interfaced. This is accomplished through a two phase process called orientation. Interior orientation is done first to recreate the bundle of light rays in each projector exactly as they were recorded by the camera. This involves centering the diapositives in the stages and positioning them so that they are the same distance from the projector lenses as the film was from the camera lens during exposure. Once the interior orientation is complete, exterior orientation may begin.

Exterior orientation is a more involved process broken down into relative and absolute orientation. Relative orientation recreates the relative angular relationship between the projectors so that conjugate image rays intersect to form a stereomodel at the desired scale. In this time consuming iterative process, each stage is rotated about its X, Y, & Z axis until a clear stereoimage is formed. The model scale was set at 1"=600'; a 1"=300' map scale was obtained using a 2:1 plotter-to-table gear ratio.

In the absolute part of the exterior orientation the model is scaled and leveled with respect to the ground. Scaling is done by computing the spatial (3-D) distances between photo control points in the model and on the ground and adjusting the plotter until these vary according to the

scale factor. Leveling the model involves checking vertical control point elevations in the model and on the ground and tilting the model until these vary according to the scale factor.

Professor Johnson did the mechanical parts of the C-8 orientation because time was so short and it was such a complex process. The fact that Skydusky, and thus the photo control network, was in the corner of both models made it even more challenging than usual; it was like we were trying to use a level in one corner to level a whole table. I learned many things during the hours of watching and helping with the orientation process though, like why most state-of-the-art plotters are equipped with microprocessors to handle much of the iterative orientation processes.

Interfacing the Digitizer

Being a German-born instrument, the C-8 is a metric machine so all of its gauges read in millimeters. Also, the stereomodel is not necessarily at the same scale or in the same position with respect to North as the map being compiled on the table. The model and map coordinate systems must some how be made to correspond to each other. The can be done by one of two ways: Pieces of information can be individually converted from one system to another, which is a pain, or one can use a neat little electronic device called a digitizer. I chose the digitizer.

The device hooks up to electrical encoders on the C-8 and registers movement in the X,Y&Z directions on a display panel. Scale, rotation and three-dimensional positional data are computed and fed into it via a key pad. After this orientation procedure is completed, the digitizer can perform many amazing little measuring tricks, if it's in a good mood. I used it to measure model distances and elevations during map compilation.

Compiling the Map

Before beginning the compilation of the map, I got a 1"=300' computer plotout of my photo control point file. I laid this under a sheet of mylar on the plotter table so that the plotted control points corresponded to the points in the model and then taped both securly down. These points of known elevation and position were transferred to the map and used to index the digitizer.

The plotting head, which holds the pencil, and is connected to the X and Y handwheels of the C-8 by a series of universal joints. The actual drawing of the map is done by putting the pencil in the down position so that it comes in contact with the mylar. In this position, the pencil draws lines corresponding to movement of the handwheels. It saves lots of time to have someone sitting at the plotter table during compilation to make sure the pencil is leaving a mark, tell the operator when two contour lines have crossed (a bad thing), record spot elevations, darken in contour lines, or do things that you would have to get up from

the C-8 to do. Anyway, the operator also needs someone to go drink beer with after spending 6 to 9 eye-frying hours at the plotter.

To begin compilation, I indexed the digitizer using several vertical control points, alternating between them until I got reasonable agreement of elevation values. I then started plotting.

Planimetric features, such as buildings, roads, and vegetation are usually plotted first. They are traced by the floating mark, which the operator always keeps in contact with the ground as the elevation changes. After plotting the planemetric features, contouring may begin.

Ideally, contours are plotted by setting the floating mark at the desired elevation and moving the floating mark along the ground using the handwheels while not touching the footwheel, thus producing a line of constant elevation. Initially, however, the novice operator must drop spot elevations and play connect the dots. This takes about five times as long as following the contours and soon creates a panic situation as he or she comes to the realization that half of the allotted compilation time has been burned up on one tenth of the map. Thus one is worried into spending many eye trashing hours at the plotter trying to learn to follow those elusive contours; but the technique, like riding a bicycle, once mastered is never forgotten.

LOCATING THE CAVE ENTRANCES

As mentioned earlier, the caves couldn't be located photogrammetrically since the woods were in full leaf at the time of the photography. It was therefore necessary to traverse from each photo control point up to the corresponding entrance, tying directly into the entrance stations of the underground surveys when possible. I soon appreciated why Dr. Johnson refused to do this part during the summer lab; it turned out to be almost as time consuming as compiling the map!

The first survey trip almost qualified as a fiasco, mainly because of a faulty instrument. I read the instrument, a Wild T-60-D theodolite with a 30" vernier; Mike Gaydosh, also a veteran of the summer lab, kept book; while John Lohner, Richard Cobb and Pat Nickenson, gave me stadia shots with a few moon shots thrown in for effect. The problem was that the vertical compensator, which uses gravity to define up and down for the instrument, stuck 5 minutes away from vertical about every third shot, causing a discrepancy between the forsight and backsight. It's quite un-nerving to apparently be screwing up every third shot when you could swear that you're reading it correctly. I was getting quite a complex when Mike remembered something one of the Teaching Assistants had said and smacked the instrument with his field book. The vertical circle popped back to what it was supposed to read and all was OK, except that we had burned up so much time re-turning screwed up vertical angles that we didn't accomplish nearly as much as I had hoped we would that weekend. We did, however, manage to pick mass quantities

of blackberrys and Mike, John and I ended up eating a delicious Sunday dinner with Buddy.

When it came time for the next trip out, Mike and I couldn't sucker a single person into helping us. I wonder why? This trip was productive but slow since we were only a two person crew and, as in cave surveying, three is ideal. We managed to finish Newberry's and Buddy's before the rain came. Five down and three to go.

We made history on the third trip. The class had not established a photo control station near Coon cave due to its remoteness and visibility problems. This being the case, Mike and I had to traverse all the way from the Harman's photo control station to Coon as well as to Paul's and Harmans from their photo control stations in one day, hopefully. We knew this would be almost impossible if done by stadia, like the other traverses, because the shots were limited to a maximum length of 200' to maintain reasonable accuracy. We decided to try to talk Dr. Johnson out of his medium range EDMI, the Kern DM500 which mounts on top of a DKM II-AE Theodolite. I expected to be turned down since he said he had never lent an EDMI out before due to its irreplacability (arount $10,000 worth). I was, to say the least, surprised when he agreed to let us use it so long as we had it back by the end of the day. I assured him we would. No problem.

It was a weekday so we didn't leave for Skydusky until 1:30pm. The DM500, which reads to the nearest .001 meters, has a range of about 500 meters so long shots were a breeze. We made really good time using three tripods and leapfrogging the instrument and reflectors until we were within about three shots of the Coon entrance. That's when darkness set in.

The distance measureing (lasar) part of the set up works fine in the dark but we didn't have the battery packs to illuminate the theodolite verniers to read horizontal and vertical angles, and it was too dark to point accurately at the reflector. This was a real problem. We wanted so much to finish up those final three shots of the survey that we played cave surveyor and attempted, unsuccessfully, to illuminate the verniers and reflector with a Bic lighter. It was about 9:30 PM when we finally gave up.

We had already blown getting the DM500 and DKM II-AE back at a reasonable hour so we decided to talk to Buddy Penley, who was sitting out on his porch when we went by. I got home about two and a half hours and three beers later to a note on the front door telling me to call Dr. Johnson. I had real reservations about calling him since it was midnight and I expected to get chewed out for being an irresponsible college student (you know the type) and not keeping up my end of the deal. It turned out that he didn't even know the instrument wasn't back and he had called to say that the second stereomedel was almost oriented but that I needed to check some elevations. What a relief.

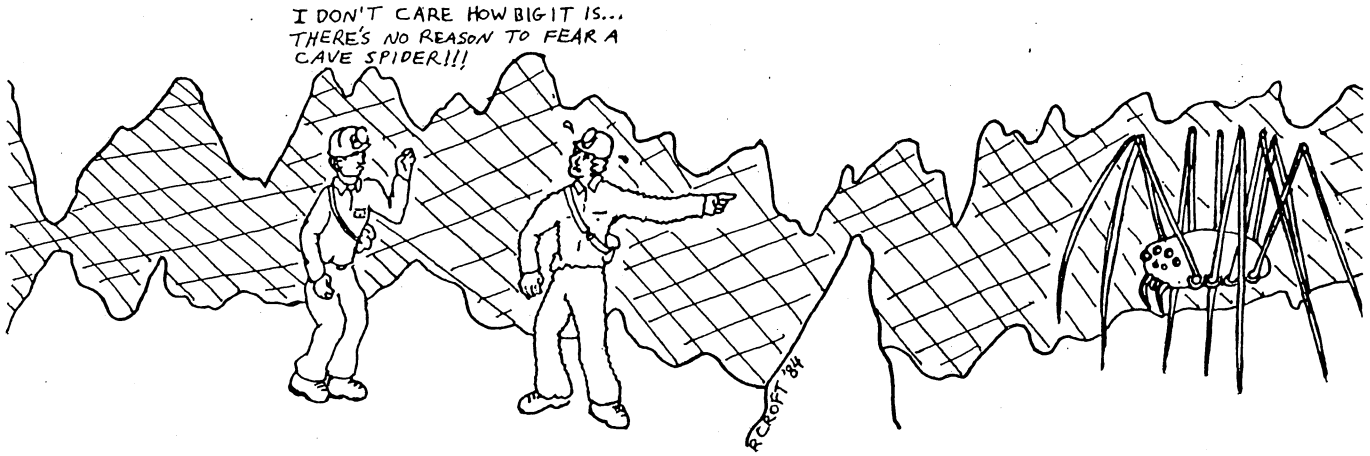
We finished up the survey the next day and took pictures of the equipment we had used in the survey, except the EDMI of course.

That weekend, at the request of Joe Zokaites, we went back out to take two pictures of each entrance station and write detailed, official-type station descriptions. A copy of each will go into the club files for future reference.

Meanwhile, back at the C-8, I was working on compiling the second half of the map. Mike and I had been reducing the entrance location data as we gathered it. Mike had computed the coordinates on the HP 9815 computer and I had plotted all of the entrances on the map with the aid of the digitizer. All that remained was to finish the contours, ink the map, and write this report.

Up to this point I had spent most of my academic time on this project and my other class was hurting pretty badly. I decided to channel my efforts into the direction of passing my final and looking for a job, which meant taking an incomplete on the Skydusky Project and finishing it after I came back from OTR and a couple of weeks of R&R in California.

So here it is, the middle of October. The map is completed and inked, very nicely I might add, and I'm putting the finishing touches on this article. It just goes to show that what Dr. Johnson said to me at the beginning of this project was true: when planning your work schedule, you should estimate the amount of time it will take and double it. Anyway, it gives me great pleasure to be typing this last sentence of a successful project and my undergraduate career.

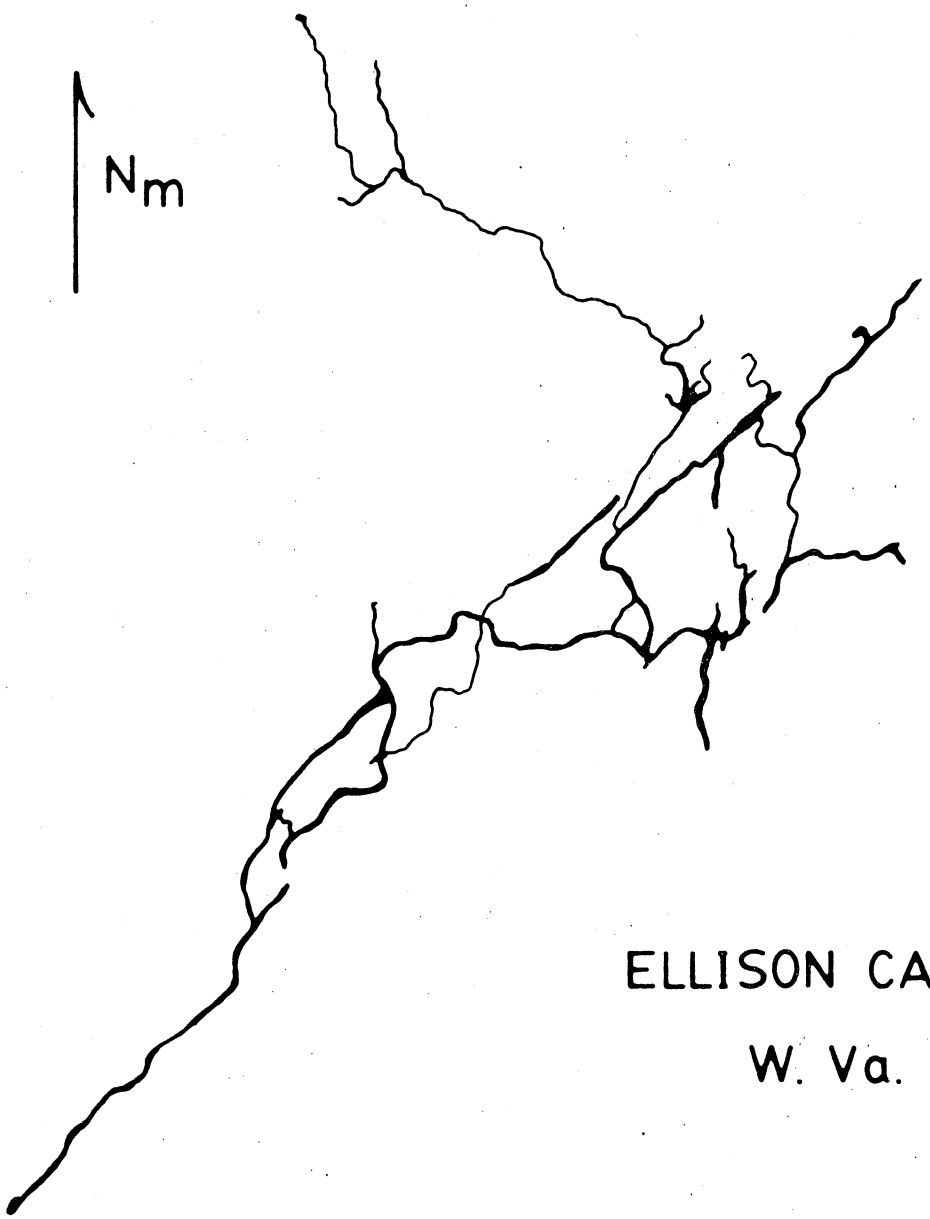


ELLISON CAVE, W. VA.

The resurvey of Ellison Cave in Monroe county began last winter after being "turned on" to it by Chuck Hempel. Chuck and company had done the original exploration and mapping of the cave some ten years previously. Since February of this year there have been fourteen mapping trips into the cave, five of which have included two crews. To date 11,567.6 feet have been surveyed, putting Ellison's on the long cave list of West Virginia (at the bottom to be sure).

Ellison's can be characterized as consisting of sumps and dry bypasses. There are a total of nine complete sumps most of which can be circumvented. The cave has two major sections (downstream Ellison's and upstream Ellison's) which are separated by an intermittent sump. Mapping of the cave began with the downstream section and was completed with about 3000 feet surveyed. The intermittent sump opened in August (a long time to be stuck on the wrong side) and the survey of upstream Ellison's was begun. This part of the cave is now nearly completed. Over two dozen VPI Cave Club members have participated, of which Frank Gibson, Bill Shipman, Mike Futrell, Jack Kehoe, Dave Jett and Hank Heidt have been especially helpful.

From: My Mommy Was A Caver



ELLISON CAVE,

W. Va.

Let's Talk Technique

I was very glad to learn about the club's concern for belaying someone on rappel and would like to add and analyze some various systems and devices for this technique.

Bottom Belay

The first obstacle encountered with this technique is for the first caver down, since no one has been into the pit yet. In this case, the caver may want to use the technique of the trailing ascender which will be discussed later. For the second or third caver, there will be no problem while rappelling because some one will belay their descent from the bottom. This is a nice method, unfortunately not all drops are the same (waterfalls & a range of depths). Rocks dislodged by the person on rope could be a potential hazard to the belayer, so he should always be in a protected area, away from the main rock fall zone. Waterfalls and stream caves present another obstacle in that voice communication may not be possible due to excessive noise. And in the BIG pits, the stretch of the ropes will vary with the brand but remember El Sotano del Barro, Mexico is a 412 meter free drop and with a static rope (approx 2% stretch) the belayer would have to pull up nearly 30 feet of slack!

Trailing Ascender & Auto Belay

Fewer cavers use such a device, than use the bottom belay. Many devices can be used but once again which is the best, or safest, or most efficient? There are several different types on the market: Jumars, Clog, Petzl Handled Jammers, CMI, Bonaiti, Gibbs Speleanshunt, or the Shunt by Petzl.

Now, when would such an Auto belay be used? A couple many cases are: loss of control or getting knocked unconcious by a falling rock. In these cases, the bottom belay (if you are not first), trailing ascender auto belay or stop bobbin descender (made by Petzl) could save us from an untimely demise. However, in the loss of control case the rope can be damaged by the cam (except with the shunt or stop descender). Speed is increasing on the descent and we want to stop via such ascenders and at the moment they catch, the shock is not absorbed and the rope sheath will take the shock.

Shunt

Fortunately, Petzl has designed a special device for Auto belay, called the Shunt. The shunt has been designed for use on single and double rope techniques. The cams are two smooth cylinders that stop the descent by pressing the rope against the aluminum body, absorbing the shock and not biting into the rope as the other ascenders do (except the Hiebeler and prussik knots).

The shunt can be used for:
1. To climb one or 2 ropes with the same diameter, equalizing the load on both ropes.
2. works well on muddy ropes.
3. a self belay while rappelling.
4. as a simple ascender.
5. an easier method for down climbing.
6. absorbs shock loading by sliding down the rope.

* the shunt should not be used as a self belay on cable ladder.

Prusik Knot

The prusik knot is the least expensive type of trailing ascender and is often used for auto belay when rappelling. However, it is a bit tricky because we always have to help it move by pulling it along with us and it is very difficult psycologically to let go once we begin to lose control of our descent.

The best way to avoid all the hassle of deciding which device to use is to buy a Petzl stop bobbin descender which cost around $25.00. It is light and small. I used it in El Sotano del Barro and have used it while carrying up to 30kg of gear in a rappel. This device can be some what of a hassel, however, on very muddy, stiff PMI. Remember, the main rule in caving is not to get killed.

by Alejandro Villagomez

References

Phillippe Ackerman	Personal communication	April 1984
Phillippe Cartageaux	" "	February 1981
Jean-Marc Magnon	" "	August 1982
Mike Meredith	Vertical caving, pp29, 60	
Neil Montgomery	Single Rope Techniques	1977
Petzl Catalogue		
PMI Catalogue		

From: My Mommy Was A Caver

VPI CAVE CLUB RESCUE GEAR:

Equipment Inventory and Suggestions for Use.
By Rescue Chairman Lawrence Britt 12/83

First aid kits 1,2,and 3 are to be used in case a search for the victim is necessary. Three groups of four people each should enter the cave after a search plan is worked out on the surface. A person should be permantly stationed at the entrance with pencil and paper to record the names of everyone who enters the cave and should check thier names off as they exit. Each search group should have a first aid kit which contains basic supplies. Once the victim is found, two stay with him and two exit the cave to tell the surface coordinator his location. Flag markers are provided to mark the easiest route.

Immediately kit #4 should be taken to the victim if he has suffered severe trauma as well as two wool blankets. The arm and leg splints should go if needed. As quickly as possible the ABS Stokes litter should be carried in with sling to immobilize the victim. The surface coordinator will then appoint an underground coordinator who will grab the chocks, pulleys, sling and ropes and enter the cave to start rigging the crawlways and drops. Rigging should always start at the victim and proceed outward. As each drop is successfully negociated on the way out it should be derigged and that gear taken past the victim to the next drop lacking gear.

We have a chock pack with twelve chocks, each fitted with a carabiner and a runner. We also have a complete bolt kit for those who know how to use it. The rigging pack has seven sets of SARA pulleys and carabiners as well as three GIBBS ascenders for stop cams and tensioning. A rack is provided for high line systems as well as assorted sling for rigging.

A four point suspension is in a box tied to the Stokes to permit a victin in shock to be raised horizontally. A full face mask (welders) is also included. The wire litter should not be used underground because it has no insulating qualities (the Stokes has insulite) and no underneath support when setting the patient on a rock floor. The Reeves stretcher is used for tight places where the Stokes can't get thru.

We also have a battery supported set of Army Surplus field telephones with several thousand feet of wire. If the rescue is going to be a long one or a complicated one, the telephone system should be run from the entrance to as close as possible to the victim. Then, when more gear is needed, it can be called to the surface and 2 runners can bring it in.

There is also a food pack. Food and liquids should not be given to anyone with a head or stomach injury.

In addition to the Rescue Gear, we also have Club Equipment. Anyone who has paid dues can check out the gear for a weekend. 6 carbide lamps, 8 hardhats complete with garbage bags, 5 survey tapes-Keson, 50', 5 Bruntons, 1 pr Suuntos, 5 Cable ladders-10 meter. Also we have a club tarp make from parachute material (approx. 20' x 30') with 20 stakes and a stake puller.

CONTENTS OF VPI CAVE CLUB RESCUE GEAR

General Gear
1 ABS Stokes litter
1 Wire litter
1 Reeves litter
assorted arm and let splints
2 Wool blankes
1 face mask for victim
1 Parachute harness
assorted sling 5' to 20'
Field telephones and wire
3 Hardhats and lamps
assorted rope pads
16 Trash bags
3 Water bottles
1 150' rope
1 Clipboard for entrance person

Rigging Pack
7 SMC locking carabiners
7 SARA pulleys
3 Gibbs Ascenders
Assorted sling and shock cord
1 Rack with carabiner

Chock Pack
1 Carabiner
1 Camlock #7
1 Camlock #6
1 Camlock #5
1 Clog #10
1 Clog #9
1 Taperlock #10
1 Taperlock #9
1 Taperlock #7
1 SMC #3
2 SMC #2
1 SMC #1

Bolt Kit Pack
1 9/16" wrench
1 Bolt hammer
1 Pair goggles
1 Bold driver
10 Hangers
10 Bolts
25 Anchors
20 Expanders
1 Dust tube

Food Pack
1 Quart Water
1 Emergency Blanket
6 Candles
1 Stove
2 Cans Sterno
1 Pot, 1 pan, 1 cup
1 SSpoon, 1 can opener
6 Instant soups, 4 candy bars
1 Roll Toilet paper
Dump bags for carbide

3 Identical First Aid Kits 1,2,&3
1 Antiseptic
1 Cream or antibiotic
1 Box of aspirin
1 Ammonia inhalent
Guaze: 12 2"X2"
12 3"X3"
Telfa pads 5 2X3
2 Kotex
12 Bandaids 1"
1-½" tape
2 2" gauze
2 Cravats
1 3" elastic bandage
12 Cotton swabs
Butterfly closures
1 Space blanket
1 Razor Blade
6 Safety Pins
Needles
Plastic bags
1 Wire Splint
1 Compress Bandage

First Aid Kit #4
5 Triangular bandages
2 Wire splints
4 Bandage compresses
1 Gauze compress
1 Antiseptic
2 Kwik Kold
4 Tongue depressors
2 1" x 180" tape
12 Sterile 4X4
1 Notebook, 2 pens
3 4" x 5 yd elastic gauze
1 Vaseline
1 Space Blanket
4 8" x 7½" combine dressings
1 Multi-trauma 10" x 25'
3 2" x 6yd roller bandages
1 pair scissors
2 Scrub and dry

New Gear
10 Locking SMC Carabiners
24 'Pak Heat' Heat packs
60' Sling for chock Runners

From the Sign-out Sheets...

Since July, 1984, Garrie Rouse, Jack Kehoe, Frank Gibson, Mike Futrell, Lawrence Britt, Craig Ferguson and associates have surveyed approximately 4 miles of passage among 12 different caves. Estimates from the sign out sheets indicate 20800+ feet of mapped passage. As of this writting, only Dead Doe is complete with 823' surveyed. Others nearing completion include Starnes, 2+ miles; Dead Cow, 4500'; Hodges, 2 crawls left, and Nellies with one unmapped lead. Hopefully, complete reports will be in the next issue.

Also, since July, the club has logged more than 2800 man hours underground, giving us nearly 600 man hours per month. This again makes us one of the most active grotto's in the United States. Here are some of the highlights.

8/11	Starnes	L. Britt, M Futrell L. Futrell, B Shipman	59 stations, 1000' plus a new pit. 1.95 miles, one more trip to finish
9/29	Clover Hollow	J. Lohner, E. Fortney P. Ballister, P. Soboliski C Burkhead, M DeHarr, K Leonard	Kill all the white People. Smoke the Ganja
9/30	Pighole	K. Smith, B. Himmelman D Bennelt, D Bluntzer M Restivo, R Hills	We scared some trainee Scum
10/13	Dead Cow	M Futrell, F Gibson J. Kehoe	The usual, wetsuit Survey, Photo, Vertical, Raft trip. 650' surveyed
10/20	Clover Hollow	M Honosky, C Shorten L. Oxenrider	Somebody call Tidewater Grotto We need help getting out!!
10/27	Pighole	J. Washington, P Hess C roberts, A Villagomez J Park, B Wichterman R. Hills	We routed the Brigands of the evil empire and then Bopped around.
11/7	Moore's Cave Monroe Co. WVa	J. Kehoe, F. Gibson	Adam's cave, Un-reported, sucking air resurges torrents inspiring and ..... goes...all 20'
11/18	Starnes	L. Britt, M Futrell W. Pirie, E. Anderson	1010' mapped, ½ mile loop closed one more trip and Starnes is done.