

THE TECH TROGLODYTE



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THE TECH TROGLODYTE

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President's Column-----	Dave Warren	1
Vice President's Column-----	Bob Cosby	2
Editor's Pontification-----	Editor	3
Trip Report: HELL-----	Leroy Burch IV	4
Chemical Analysis-----	Adam Hungerford	5
Clover Hollow on Cable Ladders-----	Amy Stirgwolt	6
Quicklaces and Cable Ladders-----	Mark Eisenbies	6
A Note on Knots-----	Dave Colatosti	7
Grapevine-----	A. I. Cartwright	8
Like Any Other Day in Newberries-----	Susan Vermeulen	12
To Climb.....	Susan Vermeulen & Eileen O'Malley	14
Paul Penley's "The Loop"-----	Bill Steier	15
Advanced Cave Photography-----	Edwin Clements	18
Manufacture of Carbide-----	Adam Hungerford	22
Caver Notes-----	Starnes	31
Starnes Caverns Trip Register-----	Lawrence Britt	34
Unexpected Caving...	Alison Williams	35
VPICC A Perspective-----	Dave Colatosti	36
Letter: Caver's Forum-----	Mark Eisenbies	38
Contextually Ambiguous-----	Various Folks	41
From The Signout-----	Compiled by: Ko & Spot	42

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President's Column

Well folks, as I'm sure you already know if you're reading this issue, the club is approaching the end of its 50th year of existence. Yep, while America was in the height of World War II, the VPI Cave Club officially "went underground". Since that time, we've come a long way, moving from bosun's chairs to ropewalkers, wool to nylon, and relationship to relationship. In that time, VPI cavers have covered many strange and diverse territories; from Giles County, to Lechugilla, to Mexico, to Oman, and to TRA and the NSS BOG. VPI cavers have done a lot, and the fact that some cavers who graduated before many of the current students were born (no need to mention names) are still active members is a testament to the long-standing camaraderie of our grotto.

So, what's the point? I don't know, but what else do you say when everything seems to be going OK? This year, Blacksburg was chosen to host the '95 NSS Convention; we got a place to practice vertical sessions again (thanks Buddy!) that is much closer to après vertical session beer; VPI cavers were at four rescues (whew!!); two of our members became landowners; a re-survey was started and several surveys were continued; a promising group of new cavers showed up this fall; and last but not least, several people became members. (I'll bet you can't violate more rules of grammar in a single sentence!)

To all of you who have helped out in some way, shape, or form with the club this year, I'd just like to say, "Thanks!". You have made my job as president very easy, and as grad school turned out to be 17,000,000 times harder than I thought it would be, I definitely appreciate this.

However, I have two last things to say. The first deals with membership. I got the impression that some trainees think you have to be an 'elite' caver to become a member, and as I've noticed a relative decline in the number of new members over the past couple of years, I certainly hope this is not one of the causes. Getting your membership, if you want it, is not that hard. No, the club is not going to hand out memberships to just anyone who steps underground, but you don't have to be ready to go surveying in Huatla to be a member. All membership signifies is that you know what your doing in most situations underground, (*and that I can hassle you to do a lot more things for the club*). Membership is merely a point in a continual learning process, not an end. So, I hope to see more new members in '94.

The second thing deals with vertical sessions. Since we got the deck at the Ton-80, the vertical sessions have become a place to merely learn how to rappel and climb on knots. While these two things are essential, most of you know that they are merely the tip of the iceberg when it comes to vertical work. I remember the bridge as a place where people used to hang out and experiment with things like changeovers, crossing knots, rebelays, trying new vertical rigs, and heel hangs. I spent many an hour myself hanging from the bridge, trying to get un-stuck from some of my experiments. But the experiences were invaluable in preventing me from making the same mistake in a real drop. Though the bridge was more convenient than the Ton-80, we can make better use of the deck outside the Ton-80 than we're currently doing. So, I hope to see more of you out Friday afternoons when the weather warms up. Remember, our vertical sessions should not merely be places for members and experienced trainees to just teach new people, they should be places for everyone to hang out, relax, and possibly learn something.

Cave safely, and don't forget the beer at the end of the tunnel!

Dave Warren

Vice President's Column

Well, it has been a successful year so far, hopefully the remainder of my term will go at least as well as the first part. During my term we have added four new members, and I expect to see at least four more new members before Spring Break. Although bridge privileges have been taken from us, we have had rappelling sessions at Ton-80 every Friday afternoon from 3:00 to 5:00. I've been to each session and attendance is minimal; I need both members and trainees if any teaching/learning is to take place. It would be nice if we could use the quarry at Jim's more often - something to think about next semester at any rate.

A good number of trainee trips have been taken this semester, however more are needed and I can't always do it. As we all know, I am fond of those weekday trips but perhaps some other members could fill in for me. The practice rescue was a success - Scott survived (matter of opinion ed. note). My only complaint is that the after-meeting-speleo-seminars are lame - are all you guys at the Friday AA meeting or what?

BOB



ksed s'rotide eht morf

I would like to take this opportunity to both apologize for the lateness of this rag that you are currently reading and to thank those of you who have helped it to become the rag that it is. Not a bad rag, mind you, but something that's useful for all sorts of things. Like putting under the dog's bowl. Or as doormats. Lots of folks use as 'em as doormats. I'd also like to apologize for all the different typefaces, print styles, and weirdness that must abound in this publication. As I sit here and type this I, yes even I, am not sure what the final end product will be. I miss my Ko, my constant Rock of Japan to stabilize me on the long, cold, lonely nights during Trog season. Be assured then, my wanderer in the north known as Troy, that you could only be succeeded. Know then, kind (or unkind) readers that without Ko the Trog lost it's grasp on any sort of computer lab with fine Virginia Tech laser printing capabilities - and I do not have a computer. Armed with that knowledge go in peace(s) with something of an answer to the question of how formats this thing is written on.

-Spotty Dog



TRIP REPORT: HELL

Sunday, the Seventh of February I finally made it to Hell. With me were my faithless companions Steve, Sandy and Amy. We were going to survey a large and clean virgin passage, but it required traversing a bunch of nasties to get to it. With all the excitement I felt it was my obligation to be trip whiner. Of the four of us, Amy was the only person who had never been there.

We got there, We donned gear, We came, We saw, etc...the entrance passage certainly wasn't a barrel of laughs, and that was only the beginning. When we came to what is lovingly named 'Piece of Shit Pit' I began to seriously debate the wisdom of what I was here for. In order to cross the pit it is necessary to hang from a column which is forty feet in the air. When one is covered in mud and tired it becomes trickier than it sounds.

After reaching the end of the old survey, a steep mud slope beckoned us to survey it. I feel that all trainees should be required to read instruments while lying in several inches of mud. Thanks to Sandy we managed it in only three shots. The passage descended through a hole in the floor and I tempted fate by following; unfortunately my helmet stayed wedged in the slot and my head with it.

The passage itself was very impressive; where I had been in closet sized passage before, I was now in a room as big as my old dorm room(ooooohhhhhh). This ended shortly in a breakdown pile, and my excitement faded as I found myself in a breathing pinch. On the way out I had another look at a dome that interested me, once again I was unable to explore it due to a pinch at its mouth.

After our thirteen hour ordeal a feast at Hardees was well deserved and enjoyed. Until the next time - Life is Hard, Cave Short!

Leroy Burch IV

Experts say breast loss preventable

Air strikes on Iraq hit Blacksburg

Chemical Analysis

Element : Woman

Symbol : WO

Discoverer : Adam

Quantitative Analysis : Accepted at 36 - 28 - 36, though isotopes ranging from 25 - 10 - 20 to 60 - 55 - 60 have been identified.

Occurrence : Found wherever man is, but seldom in the highly reactive, energetic singlet state. Surplus quantities in all urban areas.

Physical Properties : Undergoes spontaneous dehydrolysis (weeps) at absolutely nothing, and freezes at a moments notice. Totally unpredictable. Melts when properly treated, very bitter if not well used. Found in various states, ranging from virgin metal to common ore. Non-magnetic but attracted by coins and sport cars. In its natural shape the specimen varys considerably, but it is often changed artificially so well that the change is indiscernable except to the experienced eye.

Chemical Properties : Has a great affinity for AU, AG, and C, especially in the crystalline form. May give violent reaction if left alone. Will absorb great amounts of food matter. Highly desired reaction is initiated with various reagents such as C(2)-H(5)-OH and sexy aftershave lotions. An essential catalyst is often required (must say you love her at least five times daily). Reaction accelerates out of control when in the dark and all reaction conditions are suitable. Extremely difficult to react if in the highly stable pure form. Yields to pressure applied to correct points. The reaction is highly exothermic.

Storage : Best results are obtained between the ages of 18 and 25 years.

Uses : Highly ornamental. Used as a tonic for low spirits. Used on lonely nights as a heating agent (if properly prepared).

Tests : Pure specimens turn rosy tint if discovered in raw, natural state. Turns green if placed besides a better specimen.

Caution : Most powerful reducing agent known to man (income and ego). highly explosive in inexperienced hands. Specimen must be used with great care if experiments are to succeed. It is illegal to possess more then one permanent specimen, though a certain amount of exchange is permitted.

Clover Hollow on Cable Ladders

It was an interesting idea, something Kirk had been discussing for days. He had asked me if I wanted to go on a Clover Hollow trip using all Cable Ladders. The trip sounded somewhat unusual so I thought I should go. It was a Thursday night trip, and Kirk had managed to round up Bob Cosby, Carol Zokaites and myself to take part in the excursion.

We managed to rig the three drops with cable ladders without too much difficulty. The entrance required two ladders, the canyon took three while the flowstone only used one. We also rigged all drops with Goldline. Up until now I had never had the pleasure of rappelling on Goldline, and Bob and I made the same observation about it during the canyon drop - which is the fact that not only do you spin but you bounce as well. Needless to say it was quite an experience! At the bottom of the canyon we decided to do only the regular tourist trip since the rigging ate up a lot of time. As we approached the canyon I realized I had never climbed more than twenty feet of ladder and my stomach sank. As Kirk looked up at seventy-five feet of ladder he noted that it looked "majestic". Carol was the first to the top so she belayed all of us. It only took about two minutes each for the rest of us to climb the ladder, and when I thought about that I decided I really liked cable ladders. Being able to get everybody up the drops so fast was fantastic and it seemed like we were out of the cave in no time at all. Carol informed me that using cable ladders used to be standard practice, and based on my trip I think they should be used more often. If you've never done a trip with cable ladders you might find you've been missing out.

-Amy Stirgwolt

Quicklaces and Cable Ladders

Anybody who has climbed up a crumby drop on a cable ladder in quicklace boots need not hear the annoyance it causes. This is something cool I saw at Old Timers Reunion during the ladder competition to solve this classic problem. You can use a small washer or D-rings placed within the quicklace, and hammered or bent down. Presto! No more quicklaces!

WASHER OR SMALL O-RING

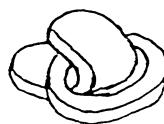
-Mark Eisenbies



INSERT



QUICKLACE



HAMMER OR BEND OVER



A Note on Knots

In recent years we have seen a rise in the popularity of small, easy-to-use, two point-of-contact vertical rigs. The Mitchell and Frog systems are just two examples. This article is not about their merits or their safety. Everyone has their own opinions on that. This is written merely to draw a parallel.

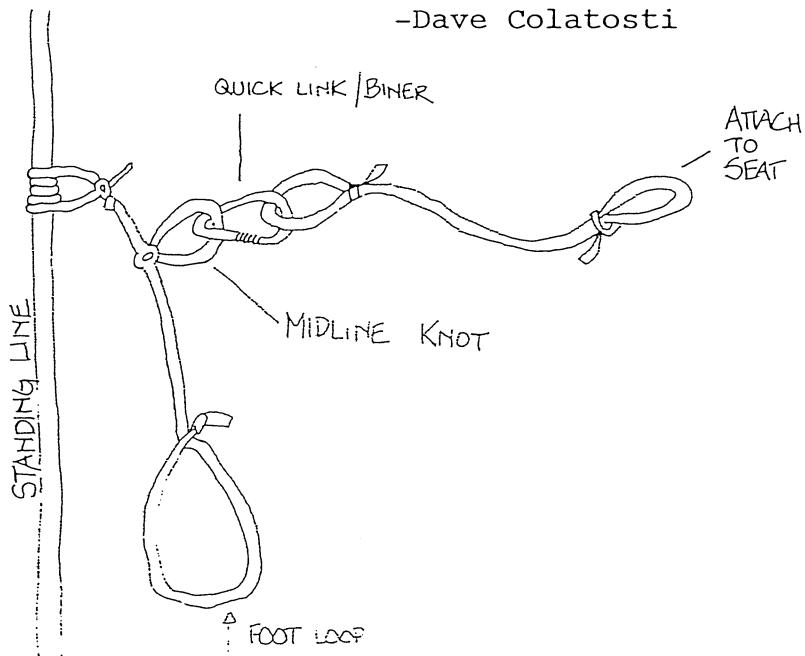
In finding ways to move through a cave quicker, some cavers have been using two knots (prussik, helical, or other) to climb up small drops; a small drop typically being one of forty feet or so. Some people think that using two knots saves time in rigging and derigging. Whether the time saved is worth the safety risk is another sore point of contention among cavers. Regardless, the two knot system is in use - even I prefer it in some cases.

Ok, so where is the parallel? Well, these short drops that many of the mechanical two point systems work so well for are, typically, nuisance drops against a wall. In a properly rigged two point mechanical system both ascenders are tethered to the caver's seat. This prevents the disastrous heel hang if the top point fails. However, as Doug Bruce has pointed out, if there is a failure of the top knot a major heel hang is induced. If this system is used on the aforementioned type of drop the impact of caver against wall could be as damaging as a fall.

If one were to continue using a two knot set-up for short drops it would be wise to incorporate the tethering idea that most mechanical two point systems use. Here is one solution to the problem.. Put an appropriate mid-line knot in your foot prussik. It should probably be located fairly close to the ascending knot on your prussik cord. Then use some hardware (quick links or such) and a length of webbing or prussik cord to attach the mid-line knot to your seat. To minimize the fall, the length of the tether should be as short as possible without impeding your climbing ability.

This addition to your rig is minimal in complexity and weight, and might provide additional safety. This idea could also be very easily adapted to the classic three knot system.

-Dave Colatosti



Heard it through the GRAPEVINE

Well, exam time is coming and it's time to buckle down, postpone caving trips, give up Friday Speleo-seminars, and do some real studying — but only for you students! Ha ha. The rest of us don't have to give up squat!

It's also time to reflect on what has transpired since the last Trog came out in . . . wait. When was the last issue? I can't remember that far back.

So we'll just have to guess and go from there.

If you haven't figured it out by now, there are new officers in the club. If you don't know who they are, forget it.

Banquet was a blast. The club celebrated the 50th anniversary of the VPI Grotto — the very first student grotto and third oldest grotto. Everyone showed up in their Sunday best for the festivities. R.E. Whittemore (membership #12!) spoke and gave a slide show of some of the founding members of the club. He told stories about the partying and good times they had. The more things change . . . Betty Loyd, the club's first female president, was also there to take a bow. Let's hear it for the ladies!

Dave C. fumbled through the awards, forgetting only a few of them in the trunk of his car. Landowners were recognized, as was Ko, who received the A.I. Cartwright award.

Only slightly less prestigious was the Flameout award to Paul Hess. Now his parents have something to brag about. Jim and Judy won some easy-on clothing to use in the event of another one of those poorly timed leg injuries.

Kirk and Paul K. each won a grammy-cracker award for their guitar playing. Since Paul was absent, his roomie Eileen, who was staying at Cecile's (foreshadowing), offered to take his home. When she awoke the next morning, she found nothing but the wooden base under the sofa. Apparently, gold spraypaint is Ronald Ann's favorite flavor.

The post-banquet party was filled with lots of dancing, drinking, sauna-ing, and other craziness. Nat and Jeff almost burned a hole in the dance barn as they gyrated around the floor. They were so close it was hard to tell where one stopped and the other started. Craig kept the music playing and the bodies moving till the wee hours o' the mom.

The fire attracted a lot of attention, but it was easy to tell who were new trainees and who had been around awhile. It's all in what you wear — or don't wear. The stream was freezing, but that didn't stop sauna junkies from taking the plunge.

The threat of layoffs at the arsenal had convinced a few folks to brave a return to school. Glen, Jim, and Craig were among those who found themselves students again. Okay, which one will be voted Vice President in the next election?

Picnic was held in its usual place, though it wasn't quite the same without Buddy. What was the same is that it rained, no *poured*, the majority of the weekend. Mother Nature was kind enough to bring out the sunshine on Sunday, as everyone was packing up to leave.

Only three people were brave (or is it dumb?) enough to bike out. Butts and legs were sore for Paul, Ko, and Dave C. To ease the trip, their road crew dutifully showed up with water and snacks — unfortunately the bikers were already at the site.

The chosen weekend coincided with Easter weekend, so the Beer Hunt took place at the picnic site. Participation was not up to usual standards, to the chagrin of the kids. So if you waited just long enough and then asked nicely, one of the Zoe kids would walk you to a hidden beer and point it out.

Cavers worked hard (did I just write that?) all afternoon on Saturday, clearing a lot of brush from the hillside. It was added to the fire, along with a groundhog caught by Pyro and Barb's dog.

Hoss turned out a great pig/venison roast (no one felt like plucking the groundhog), everyone ate heartily, there was singing 'round the campfire, and even 'The Great Marshmallow Battle of '93'. Everyone had fun (except for Philip, who complained the whole time).

Old signout on Eakin Street was bustling this summer when Ronald Ann had eight puppies. How did all those doggies fit inside? Mom was grumpy and the kids were noisy, but it sure was fun watching those little spotted things running around the lawn (I can say this because I wasn't living there!). Cecile managed to sell off all the puppies and Ronald Ann finally got to rest. She's now back to being a puppy herself.

Speaking of signout, it moved to Apartment Heights, which is becoming a caver community once again. Signout is now hosted by Dave and Dave. Yes, the Dave club is still going strong, and now the Al(I)isons and Jens are taking over. If you see a couple of old farts, just call them Ed & Lynn.

Kim threw a birthday party/pig roast in July to celebrate Dave being older than the hills. There was lots of great food and a keg. Dave W. and some others spent the day pretending they were expert volleyball players, but the rest of us weren't fooled. Professional volleyball has fewer beer breaks. Blacksburg's finest paid a special visit that night in surprisingly low numbers (the formula goes something like this: one fender bender = nine squad cars with lights flashing). Doug greeted them with his most courteous "Zeig Heil", but the cops, looking for an argument, broke up the party (after all, these guys have to have *some* fun).

Russ and Sandy hosted the annual party at their home on the waters of the Chesapeake. It was a good weekend to canoe or just sit on the back porch and chat.

The weather was great, and the skeeters and no-see-ums kept their distance. Those foolish enough to trust Buckwheat's sense of time ("It'll only be about five hours on the water") were treated to a *full* day of sailing on his parents' boat. Despite the captain's best efforts, no one fell into the water. The boat sailed swiftly on toward the dock. Nine hours later, it was time to drive the lobster-red passengers back to Russ and Sandy's place. If only Buckwheat and Lynn hadn't left the car headlights on — all weekend.

This was a busy summer for cave injuries. VPI cavers were involved in *four* rescues this summer; in Crossroads, Organ Cave, Porters, and Scott Hollow. Doug even got himself a "hero shot" on the evening news. How much do you think he paid for that?

Well, Maurya finally suckered Kevin into buying her a diamond. All the bachelors of the world are disappointed now that the flirting will come to an end . . . or will it? She wasn't the only one with a ring, however. Patty was flashing her own from Brian at OTR. Okay, ladies, whose is bigger? (I mean the ring!).

The weather at OTR was kinda nice, kinda rainy. So what else is new? Everyone had fun, everyone was hung over. The Elvis Grotto was a little too quiet this year, and some of us missed the Naked Disco. Maurya and Paul K. both celebrated birthdays over the weekend (guess which one is older?).

If you hung around the VPI tarp for too long, you had to listen to the old farts complaining about how OTR was currently being handled – but they were still glad someone else was running it!

VPI did well in the contests, but it looks like the adults were left in the dust by Andy Loud and all three Zos, who collectively cleaned the place out.

Kirk took to the stage Saturday night and played some of his favorite tunes on the guitar. The only enthusiastic fans were from VPI (the ones who should know better), until he started playing "Charlotte the Harlot", which got everyone's attention.

Brian Cruikshank made a guest appearance at OTR and spent the weekend walking around hugging people. I guess it gets lonely in the Rockies with no one but the marmots to keep a man warm at night.

Spotty Dog and Lawrence headed up a caravan of five vehicles for some four wheelin' on Sunday. The winches were only used twice. Just how deep *is* that pool of mud, Lawrence?

In September the property out at Buddy's was auctioned off. The Zos were on hand to pick up a few favored items from the house (just ask Carol about the deer head). Molly owns the mountain, and Doug Perkins and Lynn Richardson purchased the plot of land that holds the entrance to Buddy Penley's Cave. So far they deny any plans to build a house and start a family. One of the bigger concerns has been resolved: Yes, picnic will continue to take place where it always has. Molly says she wouldn't want it any other way.

Practice Rescue took place in November. Poor Spotty Dog was "injured" in New River. Lucky for him, there was a large trainee turnout to save the day. Okay, so the little container of Jack tucked into his suit helped as well. It took six hours and lots of learning to get him out and down the mountain. Despite some confusion ("Who's in charge here, anyway?"), the rescue went well. Everyone survived spending a day underground with each other, though it was touch and go for awhile there.

The club welcomed a whopping two new members since the last issue. Alison Williams joined the ranks first, and was followed a month later by Susan Vermeulen (it's about damned time!). They both did well on their tests and were voted in with only a few people cursing and spitting on the floor.

The Halloween party took place at the Church of Rock & Roll, Alan and Shannon's new digs. Alan and his band played for us with only a minimal amount of repetition ("Didn't they just play this one?"). Shannon grabbed a microphone and treated the early morning stragglers to a song. We suspect it was aimed at getting people to leave so she could finally go to bed.

Amy organized the decorating (nice job!) and the clean-up crews, which was a good excuse for some people to crash there. Even before the last die-hard partiers were finished, people were found sleeping on the sofa, on the floor, and even on other people (yes, Amy and Bob, we have pictures!).

This year's party hosted quite a variety of faces. Some of those that attended: Lui Cifer, The Phantom of the Opera, Officer Friendly, and of course The Cereal Killer. You could even sit on Santa Claus' lap (but only if you're female – Ray's not *that* jolly).

There will be a follow-up party at the Church of Rock & Roll on New Year's Eve. The band has increased by two cavers, so come out and enjoy the tunes (but please, leave the tomatoes and rotten eggs at home).

Will and Zina just discovered that they are pregnant (oops!). Their little bundle of joy is due in July. Be sure not to mention to Will his recent water gain; he's really sensitive.

Sue Seltzer recently swore off caving. When word got out, discussions concerning why were second only to arguments over who got her gear. After the fighting was over and everyone had laid their claims, she changed her mind. Of all the nerve!

At about the same time, we learned that Doug and Sue are moving to Tennessee. Doug plans to finish school and Sue plans to hang out until she has to either get a job or starve. The good news (?) is that the club will see the dynamic duo more often, and now there's a place to crash if you want to check out more than just the TAG caves of Tennessee.

Mate swapping is running rampant, as usual. We need a "Who's Who in Caver Relationships". Unfortunately, there's no point in mentioning who is dating whom — by the time this comes to print, it will all have changed.

My sources tell me that the old farts haven't done anything noteworthy this past year, so just make up your own gossip.

I guess that pretty much wraps up the news. We hope that everyone has a safe, happy holiday and hope to see you all at the New Year's Bash.

A.I. Cartwright

Like Any Other Day in Newberries

One extremely warm day in mid-November, ten cavers mistakenly decided to go underground. It was sunny and seventy degrees Fahrenheit. What were we thinking? I could go into the psychological aspects of spelunkers, but I will leave that to the experts. Not to mention, the copying bill for such an endeavor would be astronomical.

Anyway, while enjoying time spent with the landowners, it was noticed that the trainees were getting restless. "Why am I awake?" "I should be studying for Genetics." "You know we could go hiking. The A.T. is just over there." "So, you want to move in together?" "Sun is cool....eh, eh." "Where'd the Zo's put their beer. One shouldn't drink and cave, right?" Right, but no trainee reasoning could stop these adventurers from doing the right thing. Cave like we have never caved before.

After checking out a new sinkhole, we drove to the cave. Mike3 managed to take a chunk out of his gas tank on various hidden rocks in the field. "Jeezus Criis!" Now that Mike3 was typically distressed with other things, the rest of us were jovial and prepared for the trip down. To our amazement, more experienced cavers were ready before most of the less experienced cavers. This is a first in my memory. Maybe the plague of ladybugs caused such efficiency.

The rigging crew proceeded to the entrance. As my confidence in rigging began to slip away, it was decided after much discussion that Carol was capable of belaying without being tied-in. Time was wasting, and people were hot. Having only rappelled the entrance or never being in this cave, many of us hoped the butterflies in our stomachs would somehow help us to float down that dark hole. *Sewing machine leg* didn't help a few of us either, but we all did it practically unscathed.

By having plenty of experienced people on the trip, the rigging crew could proceed safely to rig the Nuisance Drop and Bill's Rappel. This was my first cable ladder rig. I studied the previous night and made inquiries

as to ideal situations. Through discussion with Joe Zo about this contraption, it was clear that I could rig safely, but timeliness and efficiency was lacking a bit. What's new with inexperienced riggers. As it was prophesied, Carol questioned my bomb-proof ropework. It apparently wasn't convenient for her. "Joseph! I haven't seen this type of rig for 15 years!" (This is probably a misquote, but she showed her age successfully.) The rigging crew decided that she should be more flexible and stop wining. It was also decided that I should be the first one down, since I rigged. It's the same mentality that made the ancient Roman architect stand under a constructed arch when the keystone was put in place. "Will it hold?"

The others were finally catching up, and we still needed to rig Bill's. Joe Zo and I sat below marveling at the light from carbide lamps streaming down the straddle pit. We also showed, much to Corwin's dismay, how deep the pit is as he was traversing the straddle. "Rock!.....

.....thud." "Great. Thanks, guys."

People were moving down the ladder at a quick pace. I was feeling confident about the rope possibilities. I had a clue this time. While tying on the rope pad, I did the rock test for Stephanie and Eileen at Bill's. "Rock!.....(a sound like wind blowing across a taut piece of plastic).....SMACK!" "Oh, my gawd!" "We're rappelling that?" This was many people's over 100 ft rappel. Hearts raced. Pulses quickened. After I amazed Joe Zo by not creating spaghetti with the 200+ rope, we started our descent. I must say that Bill's is the sweetest rappel, at least for those who utilized the handy ledge. Eileen and a few others decided to deal with the lip the hard way. Luckily, they all won, but it wasn't an easy fight. As for the rappel itself, Corwin discovered what happens when "belay" is yelled during a descent. The pit wall became ten feet way, and he jerked to a halt. 'Taint nothing like the shock of education. Joe Zo also had many of the trainees stop half way

down to point out a ledge that defines where the straddle pit ends. Due to their highly attuned concentration, this detour confused a few of the rappellers. Tentatively, they speculated whether or not they were supposed to get off rope at this ledge. If so, how? It was five feet away. Fortunately advice was sought. Four trainees in a row asked where they were supposed to go while on rope. Joe Zo and I in our infinite wisdom replied, "Down!"

Several of us already down decided to cave locally to prevent hypothermia while the others came down. The Devil's Staircase was in our midst. Everyone was pumped. Angie and I with Stephanie and Eileen on our heals stealthily made our way up, with occasional coaching from Joe Zo for direction. We learned about loose break down piles and slippery slopes. On occasion, we met up with the other five people on our trip. Who knew Kevin and Jonathan were quietly caving behind us? Carol enjoyed seeing the cascade of light down the Staircase created by nine headlamps.

At last, the climb that most of us knew was coming. The dreaded Coat hanger and the b-tard of a climb after it loomed. Having only been dragged up the Coat hanger by belay line, my caving-self-esteem has never been charged by this piece of Staircase. The natural foothold is just not high enough for me to utilize the spot for my knee. I tried other ways while waiting for the others. Lay backs,

toe jams, full pull-ups, *nada*. The pile of rocks was my last resort to do this on my own, and I did it. Everyone made the climb on their own. Because some of us didn't do the climb the same way, doesn't make the other ways less respectful. Some of us need belays, some of us need full rigs, and some of us need nothing at all to make a climb. Cave accordingly.

The next climb everyone usually can do on their own but half usually injure themselves. A few of us were a tad over zealous pulling ourselves over the sharp lip. Bruised ribs and near castrations ensued. We regrouped and had a snack. As sign-in time neared, we quickly pursued the entrance. The trip reversed, and riggers were in the rear. Carol was our own pied piper leading us to the entrance by the sound of her voice.

Finally, the trip was completed. The night sky was beautiful. Orion raised out of the southeast horizon. We sat in the field on a warm, autumn night consuming brie, breakfast bars, and beer. A sort of graduation was held in the midst of all the verbal pats-on-the-back. Lessons were learned, fears were conquered; and time was well spent. It was difficult to start the long drive home.

Susan Vermeulen
28 November, 1993



*To climb rock-pile or not to climb rock-pile,
— that is the question:—*

*Whether 'tis nobler in the cave to suffer
The hypothermia of outrageous expectation,
Or to take footholds against a sea of testosterone,
And by opposing end them?*

To climb,—to fall,—

5

*No way; and by falling we cause rescue
The body-ache and a thousand natural cuts
That flesh is heir to,—'tis a laceration
Devoutly to be missed.*

To climb,—to fall,—

To fall! perchance to die:—ay, there's the rub;

10

*When we have conquered this frippery,
Must give us pause: there's the respect
That is meaningless in technique*

For whom shall bear the taunts and the stigma of

15

The oppressors' vanity, the troglodyte's command,

The jabs of laziness, tacit agreements,

The insolence of experience, and the spurns

That impatient attitudes of the "worthy" takes,

When they themselves have questionable form

With a bare bodkin? who would the cave gods ordain, 20

To grunt and sweat on weary descent,

But that dread of contradiction while traversing,—

The multifariousness of an ascent, from which differing

Approaches may suffice,—puzzles the will,

And confuses what is appropriate for said climber,

25

With what is effective for others we know not of.

Thus honor makes patients of us all;

And thus the desire for resolution

Is crippled by the politics of skill

And relinquishes the core of the matter,

30

With this regard, safety is forgotten,

And lost in the name of honor.

Susan Vermeulen & Eileen O'Malley
with William Shakespeare

PAUL PENLEY'S
"THE LOOP?"

It all started on November 6, after the weekly Cave Club meeting. I was looking for a cave trip to join for that weekend and wow, did I find one! The trip was planned for the following weekend, but that didn't matter it was going to be a tough and rewarding trip. "A ten hour trip, minimum.", a "Bring an extra shirt in case you get cold.", a "Lots of tight passages and a couple of nasty stream crawls" trip. These were some of the warnings, or should I say, some of the advice Joe Zokaites gave us before the trip.

November 14, 1992, Joe, Leroy, Amy, Steve and myself left Blacksburg bright and early for Skydusky Hollow, and Molly Penley's home. Molly greeted us at the front door and invited us in for a chat. About an hour after we had arrived there came a knock at the door, and in walked another dozen or so VPI cavers. So much for our early start. The house was full of cavers, standing room only, and we decided that it was time to start our expedition. Next stop, the Harman's residence to ask permission to complete our trip by exiting their cave entrance. After knocking on the door, and looking around the yard for five minutes, we decided no one was home except the dogs!

By this time it was getting late and we all were anxious to get into the cave! Once every one was in the cave we set off for Whisper Hollow. Not too far along we came to a thirty foot climb down, covered in loose rock, one at a time we each climbed down and continued on. The cave had been quite pleasant up to this point, but here is where the fun began. Our first obstacle was a jagged loose rock, with a piece of orange flagging tied around it warning, DO NOT TOUCH. Followed by another loose rock above an near stream crawl, if you keep your butt high enough you wouldn't get wet. It was at this point that I knocked my lamp off of my helmet for the first time.

Whisper Hollow lay on the other side, it was a nice walking passage and filled with bats. The plan was to rig a cable ladder at the end of whisper hollow and later climb it. Leroy rigged the cable ladder and we all dropped off some of our extra gear. Joe estimated four and a half hours to complete the loop and return to this point, at the bottom of the cable ladder.

We then backtracked through Whisper Hollow, and carefully crawled past the two loose rocks; I kept one hand on my lamp for fear of loosing it again. We stopped next to a small passage better known as the Z crawl. With a lot of grunting and groaning, we all emerged on the other side in one piece. Once through, we all had the same question, why is it named the Z crawl when it's really in the shape of a W? Continuing along, stopping occasionally to poke around and find the right passage,

we made our way to a very interesting formation, the tongue, drool included.

We chimneyed down twenty feet directly below the tongue and ended up on a thirty-five foot high ledge. Using a piece of sling I did my first arm rappel and landed safely at the bottom. The only way out of this good sized room was up a fifteen foot dirt/mud wall. Using me as a ladder Leroy climbed to the top. Then using Joe as a ladder I climbed up, as I threw my hand over the top all I could hold on to was a mound/ridge of mud. After almost trampling Joe to death Leroy was able to help me up. Amy was third, she stood on Joe's shoulder while Leroy and myself easily lifted her to the top. Steve, the fourth in line, reached his arm over the top as I had and, my fears about that mound of mud came true. With one big heave Steve pulled down a chunk of mud the size of a 19" Sony Color Television, with remote of course, right on to Joe. They both fell down with a horrible THUD! No one hurt, Steve tried again and made it, with Joe soon to follow.

From this point we chimneyed down a passage about twenty feet and began what would turn out to be a very long crawl. Earlier Amy's lamp had started acting up and about a third of the way up this uphill crawl it died. Steve helped her with it while the rest of us crawled on. As I continued I ran into a dead end, yet Joe and Leroy were no where to be found. After backing up about ten feet and looking up I saw a hole. Thinking I was out of the crawlway I stood up only to find more crawly passage! After climbing up a ten foot well and continuing we reached another dead end. By this time Amy's light had gone out again. As she opened her lamp and poured the carbide soup into her dump bottle we all had a good laugh. Not knowing where to go Joe decided to tell us it had been eight or ten years since he had last been in this cave!

A closer look at the situation gave us a few possibilities. There was a hole in the ceiling and about twenty feet back down the passage there was a yucky looking crawl. Joe decided to check out the crawl and Steve went climbing. After a while Steve's voice was very faint so Leroy climbed up after him. Amy stood at the bottom of the hole and I went to the start of the crawl that Joe went down. With much difficulty the message was sent to Joe that Steve had found elephant tracks. Several minutes later Joe emerged and the rest of us climbed into the ceiling. The tracks led to the left through a very tight squeeze. Once on the other side we chimneyed for more than a hundred feet on thick clay covered walls. And then we saw her, the naked lady of the cave. With one hand held up, was she beckoning us closer, or attempting to keep us away? Not knowing, we climbed down past her. Chimnying another thirty feet we came to a mud slope over looking a thirty, or eighty foot drop, depending upon who you ask. Never the less we turned around and started back. That tight squeeze we had just came through turned

out to be much more difficult in the uphill direction. Joe, the last one through, after several failed attempts had to be pulled out. Back at the bottom of the climb it was decided that the only thing left to do was leave the way we came in.

Only forty feet back from the where we had climbed into the ceiling I noticed a passage we had not seen on the way in. It looked tight, but anything would have to be better than crawling all the way back. Boy, was I wrong! Amy looked at the opening and dove right in, since I had found the passage I jumped right in after her. After about ten feet things got bad, the floor turned to muddy water and the walls closed in. About sixty feet down the passage we were on our sides laying in the mud and unable to move our heads. Above us we could see that the ceiling went up another five feet, but protruding rock ledges prevented us from sitting or standing up. Up to this point we could still see lights at the start of the crawl, but now the passage turned left and started into an S crawl. As I turned left my head hit the wall for the hundredth time and my lamp fell out for the second time. With the striker now wet my lamp would not relight. Amy somehow turned herself around and reached back with her lamp in hand. Her lamp was going out again and as her little blue flame lit my light, hers went out. Beyond the S crawl the passage opened up to our relief, only to shrink down worse than before. Shouts from behind inquired whether the passage went or not. With one light out and I not wanting to crawl any more I yelled back, "No! We're coming back!" Once out Amy and I were wet to the bone and covered in mud.

Having no where else to go, we sadly gave up trying to find the loop. Cold and wet we continued out the way we came in, until Leroy spotted another passage we had missed before. As I pulled up the rear all I could hear was Leroy saying, "It's huge the cable ladder has to be around here somewhere. As long as there was no crawling to do I didn't care where it went and I soon joined them in the room. Then from the other side of the room Leroy says he's found the ladder, but the wrong end, we were at the top of the cable ladder again! With Amy and I soaked we marched back through Whisper Hollow for the third time. Stopping for a break on the park bench we tried to decide where we had taken the wrong turn. As we exited the cave we found yet another surprise, about one inch of snow on the ground and it was still falling! Back at the van we all changed a little quicker than usual, and sat down to a nice cold Old Milwaukee beer courtesy of Joe.

Bill Steier

ADVANCED CAVE PHOTOGRAPHY

By Edwin Clements

Those of us who love caving have a wide variety of reasons for doing so. Probably one of the most common is the incredibly beautiful scenery in some of them. It is inevitable that we attempt to take photos in them, for our own enjoyment as well as to share the underground beauty with our friends. The purpose of this article is to share some information that will help those who want to create cave photos that are a little more dramatic, artistic, and memorable than average.

Most people who start off taking pictures in caves carry the small, simple, inexpensive instamatic or automatic-type pocket cameras. I used them myself many times on my early cave trips, and certainly enjoyed the results. However, their capabilities are limited, and anyone who is interested in doing more elaborate photography will need to have a camera with the standard manual adjustments (shutter speed including "B" settings, F-stop, focusing, and a flash connector), and also be knowledgeable about flash guide numbers, film speeds, composition, and depth of field. This information is taught in basic photography courses available from a variety of sources, and an explanation of it is not being attempted here. However, the good news is that it is not necessary to spend extravagant amounts of money to acquire this equipment. There are plenty of good, moderately priced, used cameras that can do just fine, and not create the risk of losing or damaging expensive items in the rugged environment which we have to deal with inside of caves. (There is an old saying that anything you carry into a cave should be considered expendable. I have had some experiences of my own which verify that.)

The starting point of any photograph is lighting. In caves, the name of the game is flashes, and correct use of them can add greatly to the results you can get. Trick number one is have the flash off of the camera if possible. This prevents it from reflecting directly back into the camera lens (impossible to avoid when using cameras with the flash built in right next to the lens), and thereby creates a much prettier effect. The best general-use position is about a 45-degree angle between the line from the flash to the subject, and the line from the camera to the subject. Other flash positions can be tried and experimented with. External flashes can be attached by flash extension cords, fired by "slave" flash triggers, or can be fired manually by a helper after setting up the shot, having everyone turn off their helmet lights, and then holding the camera shutter open with the "bulb" setting. The general rules for flash guide numbers applies when aiming the flash at an angle;

however, in a cave, it is often necessary to open up one or two Fstops on the camera aperture to get proper exposure when the flash is more than a few feet away from the subject. It is also effective to use multiple flashes, held by assistants and aimed simultaneously at different formations, etc. The possibilities are endless.

Although most cave photography will be done with "electronic" flashes (strobes), there are some situations, mainly in big rooms, where they will just not give satisfactory results, because they will not have enough power. (Flashes put out different amounts of light, and generally, the more light, the more expensive the flash will be.) In these cases, there is an alternative: the old-fashioned flash bulb. These contain an igniter in contact with very fine wire made of aluminum and other metals that will burn very brightly, in an atmosphere of pure oxygen. These are getting hard to find, and if bought from retail photography stores, can be very expensive. \$0.50 - \$3.00 per bulb, depending on size, if you can find them, is not unrealistic. However, there are cheap flashbulbs out there, for those who really want to dig around and find them. They can be found in flea markets, garage sales, and the back rooms of photography stores (in which cases the dealer may be willing to let go of them at a much lower price, just to get them out of his way -there is not a great deal of demand for them, and most of them are not even being made any more). They are also sometimes advertised in the NSS news. The guide numbers of flash bulbs work just like the guide numbers of electronic flashes - they are just bigger and therefore will light up a much larger area. For example, a #5B, which is about the size of a golf ball, has a guide number (when used in the correct reflector), of about twice that of most standard electronic flashes. I use a Vivitar model 283 in this example (assuming 100 speed film), since it is the kind I use in caves. It has a guide number of about 110. The guide number of the #5B bulb is about 220. There are larger sizes, up to the #50B, which is about 2 1/2 inches in diameter, has a screw base like a regular light bulb, and a guide number of about 380 to 400. Another advantage of flash bulbs is that they can be fired by low-voltage sources (2-3 volts minimum, although a much more efficient batterycapacitor device can be constructed inexpensively). I have never tried it, but I would bet you could fire one underwater with no trouble. (You would not try that with an electronic flash.) They can also be fired by taping them together in a bundle of as many as can be assembled, with only one of them actually fired by the electric circuit; the heat from the first one will set off the rest of them, and this can make it easy to combine them for even more power and range. Of course, they require the correct sockets and reflectors, and after being used, they become garbage and must be disposed of properly. Also, please note that clear flash bulbs used with color film will give an unnatural yellowish color to whatever is lighted by

the bulb - use blue bulbs for color film, or put the appropriate blue filter (#80C) on the camera lens, or a blue-colored cover over the bulb.

I will point out, in regards to flash bulbs, that when they were invented (late 20s - early 30s), the films available were much less sensitive to light than films available now. So, when you use the more powerful flash bulbs with the much more sensitive film you can get now, you can really get some spectacular results. However, as I have mentioned, there is a limited, finite supply of them on the planet (unless perhaps some cavers or someone else who needs them badly enough buys up the leftover production equipment from G.E. and Sylvania and goes back into business making them). Therefore, one would probably not want to use them up in situations which can be handled adequately with electronic flashes.

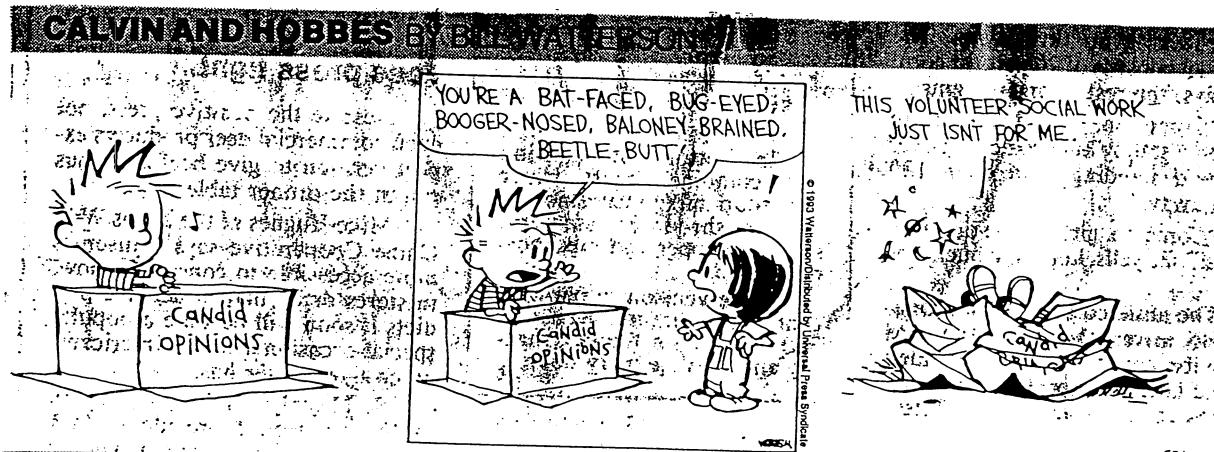
Another piece of equipment that will inevitably be used by the advanced cave photographer is the tripod. Although it will take more time to set it up and carry it in and out of the cave, it can make the picture-taking process much easier while it is happening. This is especially true if you are attempting a multiple-flash shots with assistants firing their remote flashes manually; it is essential in any situation where you will need to hold the shutter open and have more than one flash fired without slave triggers, or cover the lens while assistants move around to fire the flashes at different parts of a cave on the same exposure. A tripod also allows the photographer to use a cable release and get far enough away from the camera that his breath will not get in front of the lens and spoil the picture, in those situations where it is possible to see your breath in the cave.

A word about cameras is in order also. I mentioned previously that it is not necessary to buy expensive cameras to use in caves. The expensive automatic features on modern cameras may be of some help, but by learning to use cameras manually, anyone can do just as well with an old camera that can be bought for under \$50, as long as it has the manual capabilities mentioned at the beginning of this article. I have concluded recently that my best all-around cave camera (for conventional print photographs) is an Agfa "Speedex", which is probably at least 40 years old, and which I got at a camera show for about \$20.00. It folds up and can be carried in your pocket (although I would advise using something more rugged such as an army ammunition can). It uses 120 roll film, which gives a negative that is 2 1/4 inches square more than 4 times the negative area of the standard 35mm negative, and can give excellent sharpness in 8x10 enlargements, when using some of the 400-speed film available in 120-size rolls. (This film must be bought at camera stores. it is not usually available in such places as K-Mart, etc. The price is usually around \$4-5 for a 12-shot roll. While this is considerably more expensive per shot than 35mm film, the results can be considerably better

also.)

The subject of cave photography trips themselves is also relevant. The best cave photography is done on trips where that is the primary purpose of the trip. On a regular cave trip, someone who stops to take pictures frequently will slow the whole group down. Some people have less patience for this than others, and so anything more elaborate than just getting out a camera and doing a few quick, uncomplicated shots (i.e. anything that requires time to set up and help from other members of the trip) must be agreed upon by those involved. This is not a problem on a photography trip because everyone knows up front what is going on. It can take an incredible amount of time to set up some shots, and anyone who does it should be very grateful to those who come along to help (definitely to include giving them copies of the photos). It is also my firm belief that a more elaborate cave photography trip should be made only into a cave which you have been in before and are familiar with, and preferably one that is fairly easy to get into and out of (remember all the equipment you will have to carry!).

Finally, there is one essential element of successful cave photography which is also essential in any photography, and that is composition and organization of the photo being shot. That is something that calls upon the artistic talents of the photographer. It needs a little time to be planned, thought through, and visualized. Suggestions from other participants on the trip can be helpful, as will as having people along who know how to pose and look their best in front of a camera. The photographer is ultimately responsible for everything that gets into the photograph, and practice and experience will increase one's skills considerably over time.



The Manufacture of Calcium Carbide
To The
Manufacture of Acetylene
(In Case Your Ever On "Jeopardy")
By Adam C. Hungerford

"Calcium Carbide has become the most important discovery with regard to the industrial chemistry of this century." (Payne,32). NOT TO MENTION CAVERS

A Brief Overview Of Historical Development

"In the early 1860's Hare and Deville first formed calcium carbide by heating lime with carbon."(Nieuwland,7). Any use of carbide was virtually unknown at this time. In 1862, Wohler found a way to prepare carbide from carbon and a zinc-calcium alloy, and also recognized the nature of the carbide compound and was the first to identify acetylene as the gaseous product of its hydrolysis. Nieuwland also went on to state that "in 1893 Willson was granted a United States patent for the production of calcium carbide from lime and coke in an electric furnace using the equation $\text{CaO} + 3\text{C} \rightarrow \text{CaC}_2 + \text{CO}$.(7). Commercialization of carbide production began soon after. The production of calcium carbide, requiring very high temperatures, increased demand for electricity and as a result the number of hydroelectric plants grew as well as the industrial centers around them. The early Twentieth Century saw an increased demand in carbide for its use as an illuminant and in early oxy-acetylene welding.

In the 1920's-1950's Carbide production was at it's high point. "It was the most economic and safe method of handling and shipping acetylene,"(Tedeschi,3) and still is today. Technological advances in carbide production were bringing more demand to the coal producers for their by-products. Equipment using acetylene for illumination reached climatic levels. This era also marked the beginning of bottled acetylene for lighting, heating, and cooking. Never again after this time period would calcium carbide be used for so much. "1962-1965 saw the world's highest production of carbide,"(Payne,42) but that was not to last.

The Decline Of Calcium Carbide

Many factors led to the decline of calcium carbide's short-lived fame. The U.S. economy in the 1960's was dependent on the rapidly evolving technology industries. Coal was a fuel of the early Nineteenth Century. As methods of producing carbide improved, unfortunately, the costs of production increased. One of the most influential causes in this increase was the increasing cost of electricity. The huge electrical demand of the carbide furnaces was expensive and wasted too much energy for the furnaces to remain cost effective.

As the demand for acetylene increased new methods developed for acetylene production such as petro-chemical processes. Methane also developed as an alternative to acetylene. The

monumental demand for acetylenes, especially cleaner acetylenes, also brought the death of carbide as it could not efficiently keep up with demand.

Carbide Production

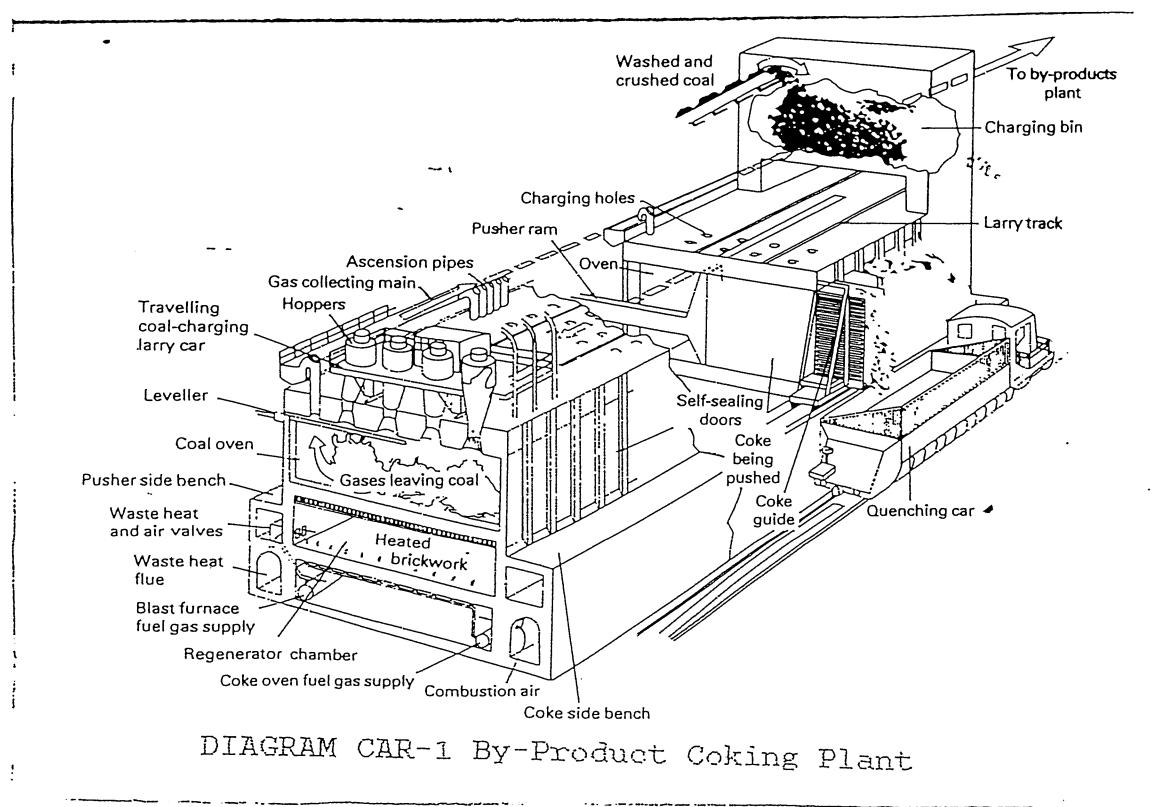


Step 1: Carbon Production (C)

The carbon used for carbide production can come from a variety of sources. The popular and plentiful is coke because it is a bountiful by-product of the coal industry. Also Nieuwland states that it is "the most often used today because of its high electrical resistivity." (7). Some of the early sources of carbon have been charcoal, bituminous coal, lignite, bitumen, pitch, tar, peat, and wood.(Nieuwland,8).

The resulting carbon product to be used in carbide production has some limitations. "The carbon(coke) component used in large closed furnaces has a grain size of less than 25mm. The ash content should be less than 15% and water less than 2%. If a high phosphorous content is in the ash the calcium phosphine which is produced from it in the furnace will react with water to give phosphine, a toxic substance which gives carbide its typical odor. Carbide standards permit only 0.006% PH₃ by content."(Payne,41).

The carbon material is transported to the carbide production facility and stored for future use.(See diagram CAR-1 for a schematic of a coke furnace).



Step 2: Calcium Oxide Production (CaO)

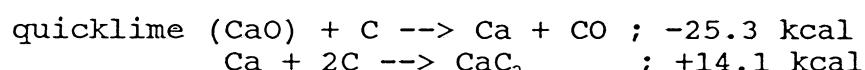
Calcium Oxide is prepared by calcining limestone, or hydrated lime. The hydrated lime (spent carbide in caver jargon) can also come from acetylene generators. Generally, carbide production facilities have prepared calcium oxide (quick lime) by decomposing or "burning" a 98% calcium carbonate (CaCO_3) to CaO and CO_2 . To prepare a satisfactory grade of carbide, the purity of the CaCO_3 and CaO must be 99%. Magnesium oxide impurity in the CaO is very undesirable since it increases both carbon and electrical power usage in the process.

"The lime component" of calcium oxide production process "is usually quicklime with a grain size of up to 50mm. The MgO content should be <1.5% and the total CaO content should be higher than 90%." (Payne, 40).

A typical lime is:

$\text{CaO} > 90\%$
 $\text{MgO} > 1.5\%$
 $\text{CO}_2 < 2.5\%$
 $\text{P}_2\text{O}_5 < 0.02\%$

In the 1940's-1960's the hydrated lime [$\text{Ca(OH}_2\text{)}$] resulting from large scale carbide-to-water acetylene generators was dumped in large lime ponds or impounds. In the 1950's many plants were recycling and buying this by-product to manufacture carbide. "Up to 60% of the calcium hydroxide which forms when acetylene is prepared from carbide can be returned into the carbide furnace." (Payne, 40). Today there is no recycling mainly due to the fact that only two companies in the world today still using carbide to manufacture commercial grade acetylene. Some other uses of the hydrated lime are in waste water treatment plants, soil neutralizers, and sand lime bricks. (Tedeschi, 9).



Step 3: The Carbide Furnace (An Overview)

The carbide furnace has been used since the beginning of the carbide industry. " The main features of the low shaft furnace are the furnace vessel, the electrodes for the supply of electrical energy, and the feeds for the introduction of the raw materials. (See diagram CAR-2).

The furnace vessel is made of welded iron and reinforced against distortions. The vessel is lined with carbon or refractory bricks, and has up to three tap-holes which are arranged above the bottom of the lining and through which liquid carbide flows into cast-iron crucibles. The zones around the tap-holes have stronger linings and are usually provided with water

cooling. Most furnaces are three phase , where the electric power is supplied by three electrodes protruding into the furnace vessel.(Payne,36). The electrodes are surrounded by contact plates, usually made of copper through which the electrical power supply flows.(Payne,37).

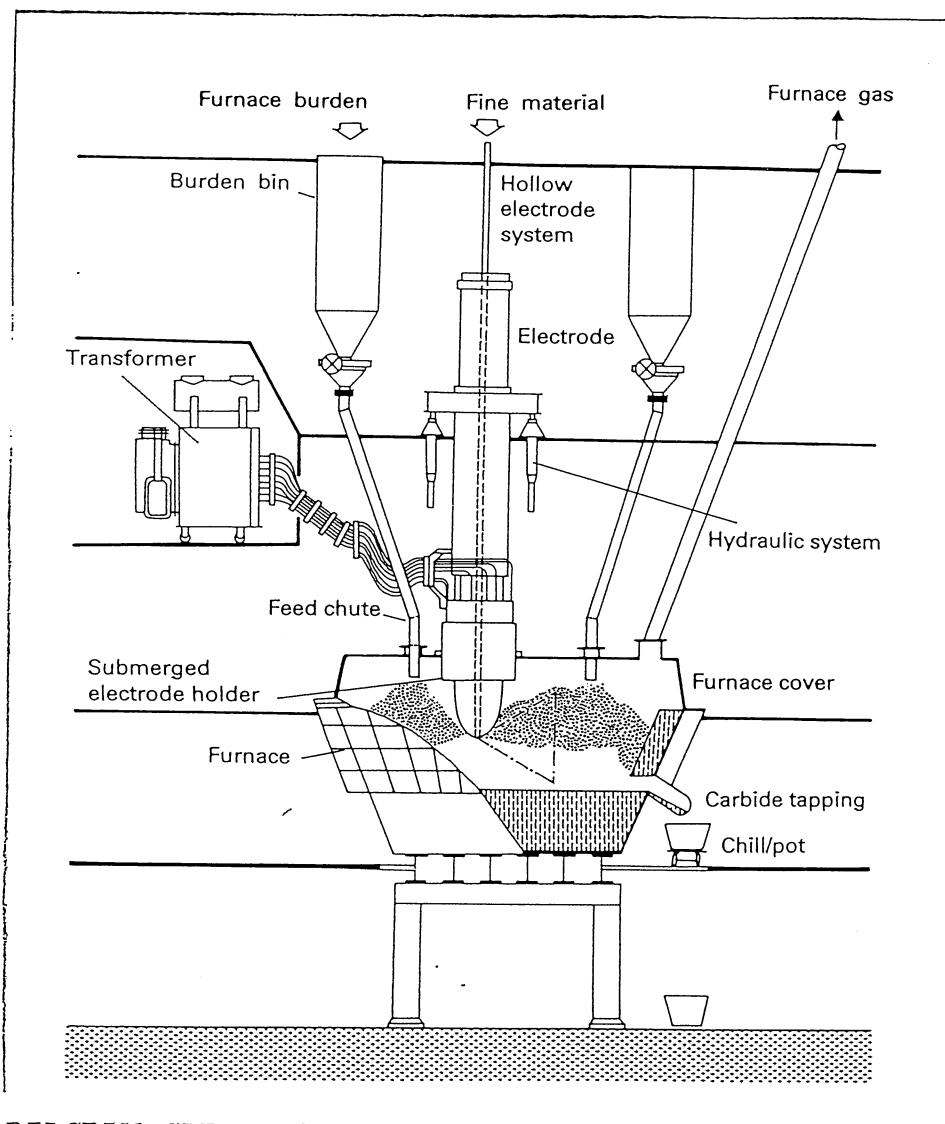


DIAGRAM CAR-2 Closed Three-Phase Carbide Furnace

A transformer regulates the correct voltage to the furnace. "Heat is generated by the passage of the current between the electrodes... and directly through the highly resistant charge of the raw materials."(Nieuwland,8).

"Above the furnace there are several hoppers from which the furnace vessel is continuously fed with the pre-mixed raw material via pipes. During the operation the carbide melt present in the furnace must remain covered with raw material."(Payne,38).

During the reaction approximately 400m³ of gas is formed per ton of carbide. To recover this gas the furnace is provided with the appropriate equipment:

1. Open furnace - The gas ascends through the raw material and burns off at the surface.
2. Covered furnace - Up to 80% of gas is retained. CO and CO₂ are collected separately and purified under a different method for each gas;
 - a. Dry process - Gas is pulled through ceramic filters.
 - b. Wet process - Disintegrators or Venturi Washers are used.
3. Closed furnace - All gas is collected and used for further chemical processes.

Step 4: The Carbide Furnace (Operation)

"Before the furnace is put into operation it is charged with part of the coke to be used, the lower ends of the three hollow electrode cylinders are welded closed, and the cylinders are filled with electrode mass and brought into contact with the coke present in the furnace.

The furnace is operated initially at a very low voltage and low intensity of current and is slowly run up until its nominal capacity is reached, which, depending on the nature of the materials, will take 4-8 days in the case of a 55MN furnace.

When the furnace is in operation, the melt contained in the vessel has to be constantly covered with raw materials," which have been dried, broken, and screened,"and the electrodes dip about 50-150cm into this material."(Payne,39). As the electrode ends burn away they are constantly (periodically) reset into the mass. The mass must be constantly covered to conserve reaction mass and continue the process. The rate of calcium carbide production is proportional to the area of contact between quick lime and coke."(Tedeschi,6).

The voltage applied to the electrodes is in the range of 100-300V while the current has an intensity of up to 150,000A. The electric arc creates an energy that initiates the reaction process around 1500-2000°C.(Tedeschi,6). This point also represents "the melting point of the eutectic between calcium oxide and calcium carbide and takes place between the molten material and the suspended solid particles of carbon.

When the reaction has progressed to the point that calcium carbide forms over 70% of the total fused material the melting point rises towards that of pure calcium carbide; 2300°C. (See Diagram CAR-3). However, as the melting point rises towards

2300°C the decomposition of carbide to calcium and carbon begins and the energy consumed in maintaining the higher temperature increases costs. As a result the product is usually 70% to more than 90% calcium carbide."(Nieuwland,9).

"Because of the high temperatures and the strongly reducing conditions prevailing in the carbide furnace, these impurities cause a number of energy consuming secondary reaction to take place. Whilst H_2O and CO_2 are expelled at temperatures of less than 1000°C, the other impurities maintained above get into the carbide melt, whilst Al_2O_3 and SiO_2 are in part dissolved to form aluminate and silicate and in part reduced. The resulting silicon reacts with the reduced Fe_2O_3 to form an Fe/Si alloy; which is an undesirable by-product in the manufacture of carbide. Most of the MgO is reduced and, in the cooler zones of the furnace, part of the magnesium vapour (sic) is oxidized by CO , so that MgO is again formed."(Payne,35).

To obtain the liquid carbide the tap-holes are opened electrically at regular intervals and the carbide flows into cast iron crucibles. To close the tap-holes cold, granular carbide is cast into the stream of liquid carbide which then quickly solidifies,"(Payne,40) into granules or ingots.

A typical 100 ton carbide furnace yield:

<u>Material Used</u>	<u>Material Obtained</u>
2000 kg dry coke	1000 kg carbide @ 80% CaC_2
1100 kg quicklime	2800m ³ gas @ 95% CO , 2" H_2
1250 m ³ Oxygen @ 98% O_2	315 kg dust
3000-3500 kwh Electric or $2.6 \times 10^6 - 3 \times 10^6$ kcal used	

Technical carbide averages 79-83% CaC_2 , 7-14% CaO , 0.4-3.0% C, and 0.6-3.0% SiO_2 .

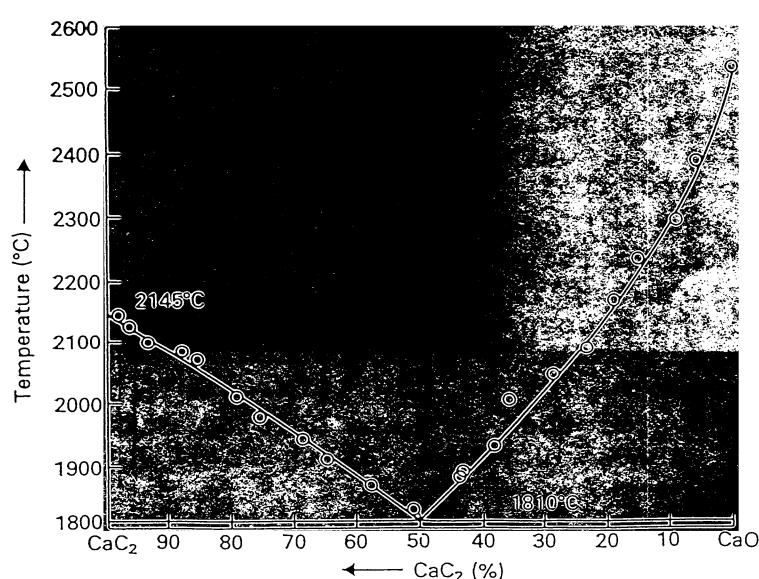
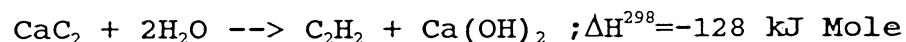


DIAGRAM CAR-3 Melting Diagram of Calcium Carbide

Acetylene Production



An 82% commercial grade of CaC_2 (equivalent to 300 liters C_2H_2 per kg) will give approximately 429 kCal of heat.

Since most of us (except for...ghast!!! electric cavers) know about the process of making acetylene from carbide I will be brief by covering two different acetylene production processes from carbide; the wet process and the dry process.

Wet Process:

In the wet process "granular carbide is fed continuously into excess water; and the slurry is agitated by gas evolution and a mechanical generator. Generators of this type operate at about 60-80°C and pressures at 15-30psi. The spent slurry is continuously discharged as fresh carbide is added and acetylene removed." (Tedeschi,7). The ratios of water to carbide may vary as Payne states, "8:1 by weight"(33) while Tedeschi recommends "6:1 by weight."(7).

Most reaction generators are characterized by stirred water-containing reactor chamber, carbide hopper, carbide feed (screw hopper) device, acetylene water scrubber, and gas storage tank. They are also equipped with flash arrestors to prevent vapor explosions if the cooling of the reaction does not occur properly.

Dry Process:

This represents the process cavers use in their acetylene lamps. A large contained mass of calcium carbide is reacted with water applied at a fixed rate. The gas is vented off and burned at the lamp tip.

Commercially, however, this process varied. Equal parts by weight of water and carbide are mixed and stirred. The gas is still pulled off, but then it is stored for bottling or future use. "The Prestolite Company, which controls United States Patents" on the following process is one of only a few companies still commercially producing and marketing carbide-based

acetylene. "Water is brought into reaction with calcium carbide near the bottom of a cylindrical reaction chamber, provided with an agitator rotated about a vertical axis. The acetylene and powdered calcium hydroxide rise to the top of the cylinder, and in one modification the powdered hydroxide, which overflows the top of the cylinder fills an annular seal similar to a liquid seal." (Nieuwland, 12).

Any prospects for a carbide lamp?? The dry process also releases approximately 475 cal per gram of pure carbide. Assuming that there are 50 grams of carbide in a typical lamp that means approximately 23,750 cal are released in the form of heat. Of course cavers never have any luck because we don't burn pure carbide. The carbide we use is 85-90% pure but that still leaves us with 19,000-20,000 cal of tummy warming heat. Nice if we could conserve it all for those long waits at a vertical drop.

Conclusion

Now you should have a general but competent knowledge about the history and production of those little grayish-black rocks you put in your lamp every weekend and the hydrolysis of acetylene that takes place. There are many reasons for the decline in carbide such as cleaner acetylenes, high cost of handling the large quantities of raw materials for carbide, new energy sources, and aging technology. Technology has advanced the generations that depended on carbide-based acetylenes cavers are a majority of the few who still depend on carbide. It may be possible, not that I know, that carbide may be a thing of the past. The last can of carbide ever produced may be the half-empty one at Sign-out right now. Tomorrow we will all be electric run off rechargeables and waiting for the day when Premier debuts it's "Model 2000 Nuko-Drive" Nuclear powered lamp. The cavers will always be here with or without carbide. What will our next source of light be?

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Caver Motel: by Starnes

On of the great aims of almost any caver is to find and push virgin cave. My goal was to finally do this before I graduated. I have never been afforded this opportunity in my five years in the club mainly because of problems with school, and missed chances. I've been on digs before, but none of those ever panned out. I also see points on topo maps that make my mouth water, but never had the time to dutifully follow up. That is up until this semester when Starnes presented me the chance with a little extra, because one of the other milestones in a caver's career is getting stuck. This story is more than a good caving anecdote. I hope that persons who have not yet had their own little crisis underground will find a lesson in the advantages of keeping a clear head (calm or not), working together, and knowing your abilities.

This spring Steve Wells invited Dave Warren and me on a dig and some surveying in Starnes, plus a chance for some virgin cave. The dig had potential if we could sledge one rock out of the way. The survey was just to tidy up a little stream section he had found as a result of a ladder climb less than a year before. We were going to be back by midnight (we still did), but not until we finished our second, unscheduled sledging where I got "delayed due to incompatible proportionment."

We decided to spend a little time at this promising site before we exited the cave. Steve and Leroy had long had their eyes on three pinches which led into an obviously larger room. When you shouted through the crack you could hear the room echo, and the trickle of water. The first pinch was high, came in from the left, and quite impossible. The second was a straight-forward climb up to a pinch into the bottom where the water exited the room. It was occupied by two bulges of rock which Leroy had tried to get past several times before. The third was the most promising from a present size standpoint, but would involve some unusual twists of the body. This is where the sledging effort began. Steve and Chummer began to pound the rock while I poked around elsewhere. About a half hour later Steve was calling to me asking if I'd like to try a little virgin cave. When I got to the dig Steve had made it through, but Chummer was too big. I was the smallest on the trip; so there was little doubt I wouldn't fit through. I crawled up the tight and muddy 45 degree slope to the pinch. To enter it I had to lie on my right hip, and work my back over a small bulge resulting in a piked position. From this point Steve explained that the trick was to get my hips level with my shoulders and push past another protrusion that ran along the sternum. My first attempt failed because I couldn't kick my hips high enough up into the pinch. I had expressed some concern that if I wouldn't be able to back out if I made it far enough in the wrong orientation. I decided to try one more time with a little coaxing from Steve. In my second try I kicked my way with some ease to the sternum pinch. I relaxed a little, pushed, and felt the rock ride along and past my sternum. "Hmm..." I thought in the back of my head, but I was in virgin cave.

The well we had broken into was about eight feet in diameter, and had a pool at one end with

gypsum formations. A ten foot climb was the source of water entering this room. Steve and I climbed up to an peanut-shaped well with chert walls. I tested holds closer to the 20 foot waterfall which proved to be rotten. Steve chimneyed the narrow part and saw that there was passage beyond. Since we had no desire to scoop and were tired from the first dig we decided to leave it. Besides Chummer couldn't fit. I have never been blessed with the kind of size that lets people like Ko or Leroy go through almost anything. Last time I tried to do the one foot, both arms through the hanger bit I drew blood shortly before the hanger busted open. My one advantage in pinches is the fact that my hips will go through anything my chest will, and my chest anything my hips will. I'm also good at tricking my body through some spots.

We went back to the pinch. Steve was confident he would fit and knew I was concerned so I tried first. I had to climb above the crack, and lower myself onto the high/"wide" part. There was no support for the legs. I slid feet first to the sternum pinch which I could not get past. Where my sternum had acted as a runner before, it was now a ratchet. I also had kicked to keep my hips high before, and now had no means to support them. At this point I became very displeased, and crawled back to Steve. I tried four more times including headfirst, but because the floor dropped away at 45 degrees I could not support myself. My last try I became briefly stuck, but managed to kick myself loose and back to Steve.

Needless to say I was quite freaked on adrenaline after the last try (my hand was shaking a good two inches back and forth when I held it out). Steve still thought I could make it, but I refused to enter that pinch again. In this room I was happy. I had food, clothes, water, and at least 10 charges for my lamp. I did not want to make a slightly uncool situation gravely worse by getting stuck where these items would no longer be available, and digging would cease to be an option.

We agreed the best option would be to exit through the second pinch where the water left the room. Leroy had tried this one many times because it was a straight-forward big on both sides pinch. I was adamant about not risking getting stuck in a way that they could no longer help, and outside assistance would be required. All that meant was we'd have to make it big enough so I wouldn't need to force myself through. After almost two hours of hammering, and many attempts I was finally able to slide through the hole. Steve came shortly after with a few yanks from Chummer. After we ate, and I got my nerves back together; we left with a hole in place plenty big for the survey trip the next week.

Analysis:

This trip is a good example of maintaining control to prevent a potential accident from manifesting itself. There were three key points which kept a call out from being necessary. First and foremost was communication. Everyone expressed their opinions and concerns so we could identify hazards and

make good decisions. Second, don't make a bad situation worse by pushing limits (i.e. stuck in a room vs. stuck in a pinch). You can stay in control of a situation keeping a steady pace, maintaining wide margins for error, and not leaving things to chance (chance is for desperate situations). Finally, keep egos in check. This goes along with the concept of teamwork. In a stressful situation the most experienced can make mistakes, and beginners can offer valuable inputs. Don't be so sure of yourself that you flatly disregard someone's opinion.

Diversity of technique is something that did not influence this trip, but is equally important in preventing accidents. A number of cavers seem very restricted in the techniques they choose to learn and use. Either they'll know just enough to get by, or they're convinced that their particular methods are always the best. Both of these attitudes jeopardize safety. There are two important reasons for learning multiple techniques. First, no method is valid for every situation, or you may be limited by suitability or amount of gear. Second, you will be able to objectively evaluate methods or rigs that are foreign to your experience. Sometimes newly developed methods are better. Many times discrepancies in style are only matters of semantics or better vs. best, but not safety. Learn to tell the difference. Safe caving means being adaptive, and your adaptiveness is greatly enhanced by knowing different techniques. It doesn't mean you can't have a preferred method, or that everyone must be a supercaver. It is simply prudent to know as much as you can. Failure to continually broaden your skills only limits your ability to deal with unfamiliar situations.



Starnes Caverns Trip Register

by Lawrence Britt

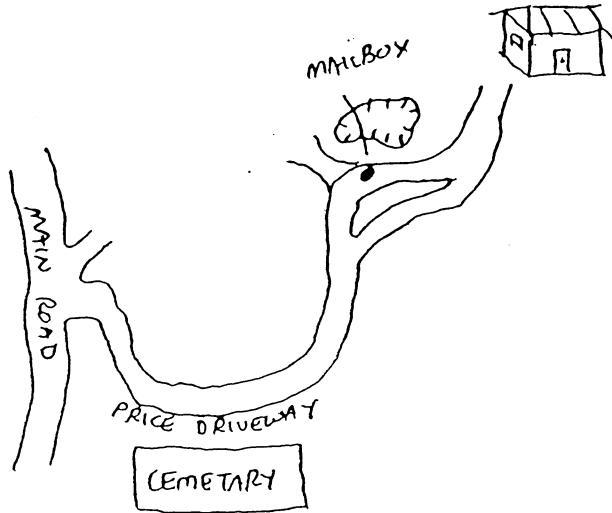
* NOTE: This is NOT a sign-out log. Each trip is still responsible for their own sign-outs elsewhere.

The Trip Register is now in place for Starnes Caverns. The register is in a mailbox on the left side of the Price's driveway about 100 yards from the house. The mailbox and three registers have been donated by the VPI Grotto to serve two purposes. The first is to give the Prices something to read and enjoy in return for putting up with the countless trips people make to their cave. The second, and most important, is in response to something Mr. Price said to me once. He was getting a little tired of people knocking on his door early on weekends and of the 'uninhibited' changing of clothes. So, now the mailbox area is the place to park and change. It is just out of sight of the house. Four excerpts from the register guidelines follow:

- * Unless Mr. Price has put a note to the contrary inside this book, you have his permission to enter the cave. Therefore, please DON'T go up to the house and disturb them. When they see your car parked here, they know someone is underground.
- * Even in the worst of weather, Mr. Price does NOT want anyone to drive up to the entrance or anywhere else on his property. Common courtesy goes a long way!
- * Please leave the gates in the position you found them; open if they were open, closed if they were closed.
- * Park on this side of the road leaving the gate unblocked.

With the register in place, let us hope that we can maintain the great landowner relations that the Prices have always given us!

By the way, Starnes is now 3.4 miles long and still growing thanks to the efforts of Dave Colatosti, Steve Wells, and myself. When the survey is completed, a new map will be published.



UNEXPECTED CAVING IN CROSSROADS

On a nice summer evening, I had absolutely no intentions of being underground. I just wanted to eat dinner with a few friends at Leah's house and enjoy a laidback Saturday night. But I guess the cave gods had something else in mind because not long after we, Leah, Mark Eisenbies, Alan, Shannon, and myself, finished eating, we heard about the rescue. Scott appeared at the door around 8:00 and soon Mark and I were off to collect our caving gear. Unfortunately, I was only visiting Blacksburg for the weekend and all my caving gear was still back in New Castle where I was living for the summer. With the help of Mark and Ko, I was able to put together everything I needed. It was one of the first examples that night of cavers helping other cavers.

Not long after we got the news, Mark, Scott, Patty, Rich Geisler, Ko, Joan, and myself were ready to head out of town on the way to Crossroads cave. We had a caravan of three cars and about a two and a half hour drive to the cave. Around 11:30 that night we reached the cave and I could see that this was not going to be like any previous caving experience or practice rescue. I remember being amazed at the number of people and lights. I was very excited about the thought of being able to help out a fellow caver, and there was definitely a rush of adrenaline. After the five of us, Patty, Rich, Scott, Mark and I were suited up and ready to go, we were told that we would have to wait and that they may need us later. I remember trying to sleep for a while but the excitement and the noise were too much to allow me to get any sleep.

Finally, around 4:00 in the morning, I got to go on one of the first relief crews with four other people. I can't say too much about the injured caver or about how things were run inside the cave because I really don't know that much. I was there to help and do whatever I could to make things go smoothly. The caver had dislocated his shoulder and was able to walk out for most of the way. Mostly, I tried to provide support and handholds and footholds while he slowly made his way out of the cave. At one point he was put into a stokes but we only carried the litter for a short ways before the paramedics took him out of the stokes. They were able to pop his shoulder back into place so he could continue walking out of the cave. Six hours later, the injured caver was out of the cave and cavers began hauling the tons of gear out of the cave.

I suppose what I will remember the most about this rescue is how everyone worked together and helped each other. Cavers came from all over to help out another caver that they had never met before and I think that is the best example of how cavers care and look out for each other. Although I didn't have the chance to go on any of the summer's other rescues, I will always have fond memories of the trip to Crossroads and how I was able to help just a little on such a big rescue.

- Alison Williams

The VPI Cave Club: A Perspective

What is the cave club? Who am I? Who have we become? These questions come to mind when I think about myself in relation to the club.

It is a group of people from many different personality types, drawn by a common love of cavers and caving. This, I think, is a pretty good assessment and does mirror, to some extent, one statement in our new constitution. But there was more for me. This group seemed and is very self-aware. People here are at ease being themselves. It was that aspect, I believe, which really bated me. Perhaps because I was a much different person back in the fall quarter of 1987.

Still suffering from the influences of my parents, I was beginning to grow and change as an individual. The open-mindedness, the strong friendships, the support, and of course the caving drew my interest. I guess I felt that this was the group to help me find out who I was.

Early on, though, my quiet nature kept me from probably the best aspect of the club, its parties. At the same time this group was the prior mentioned things to me, it also seemed to scare me some. It seemed wild and scary and I wasn't quite sure if I was ready for it. I didn't think I would fit in. But I eventually jumped in, and began to experience the club.

It was something new. From a distance it was tempting to lump people into stereotypes. He's a gearhead, she's a flirt. Look at those two, they must be sex fiends (and perhaps they were). But up close, you were forced to see who these people were and breakdown those stereotypes. They were just different. They were who they wanted to be, not trying to prove anything or impress anyone. Perhaps this is why the club has not always thought highly of Greek organizations. Frats and sororities are typically very surfacy groups of people who get together to get some idea of self identity. However, more often than not, these same people often leave the organization no better aware of themselves than when they first joined.

A sauna party was one of my first few parties. Talk about initiation by fire. At the time it seemed so wild and crazy. So much of what went on seemed to buck with my own narrow-minded morals and beliefs. But then, after hanging around with this group for a while, I began to rethink things. This was a group of people who were what they wanted to be. They seemed to do whatever they felt like, and didn't worry about what anyone else thought. And cavers, being who they were, didn't care what anyone else did. They just wanted to have a good time.

So now who have I become? I am much more aware of who I am and what I want in life. I now value open-mindedness very highly. An old friend from back home commented on how much I have changed in the last several years. He said, "A change for the better". He referred to the way I looked at life and reacted to situations. I attribute a good deal of that to the club.

I am proud to be a VPI Cave Club member and part of its somewhat strange social structure. I am also proud of my training as a caver by the club. I believe that our training program has started many

cavers on the road to becoming some of the best cavers around. But I also realize that this thinking can lead to one looking down on anyone who has not gone through our training program and that is the wrong way to look at things. All said and done I am glad to have spent many hours underground with VPI Cavers.

When you spend tons of hours underground with people whom your life can depend on, strong, trusting, and life-long friendships can develop. This, I think, is where the peculiarities of the social structure of the club originate. Even though things aren't always great between two people, in the end when the stakes are high, your fellow caver will come through.

Someone once compared the club to a big family with a lot of incest going on. This humorous analogy is accurate to an extent because there is the occasional mate swapping thing going on. Another caver added the word 'dysfunctional' to family. This I think really finishes the description of our club. Rifts do form and tensions get high, but deep down, I think we are all aware of the things that bind us together.

So now, like several people, I sort of view the club as a surrogate family. So yea, sometimes I try and meddle too much when I see rifts forming, or things going amiss. And although it is hard to watch things go bad in such a tight knit group, I am learning more to let things go their own course. In a dysfunctional family things don't always work out for the best, unless people try really hard. But even then trying hard is no guarantee. However, some things irk me beyond control. When the club as a whole is attacked, I have a hard time backing down and letting things run their course. After all, who likes to see their friends jerker around?

So this jumbled mess of words is what the VPI Cave Club and all those associated with it means to me. So you might think that I need to get a life. Well actually I am quite content with it as it is. I like Blacksburg, and I care about my friends. I think I will be around for many years to come. And yet I know I am still growing and changing. And I can't think of a better group of people to do that with than the Cave Club.

Dave Colatosti
VPI 305

700 Greencove Ct.
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April 20, 1993

Cavers' Forum
NSS News
P.O. Box 12334
Albuquerque, N.M. 87195-0334

I have been a regular follower of the NSS publication "American Caving Accidents" since I became a member in 1990. I think it has much to offer in the education of cavers on better ways of handling crisis, and techniques that may prove inappropriate for these situations. However, I feel I need to take issue with several problems that revolve around the editor Steve Knutson. These problems affect the report's objectivity, credibility, and usefulness to the general caving community.

I hope Knutson is in some way qualified to analyze the technical and psychological nature of accidents as he never presents his credentials. He seems to betray a lot of personal biases and opinions for the guru he is supposed to be. A person (what should be a group) acting in his position should be an objective observer and educator. Rarely does Knutson offer truly constructive criticisms that offer practical methods of prevention. Instead, he condemns using pious analyses with all the benefits of hindsight, and operating in an environment without stress or time constraints. I find it odd he can write so confidently while using conjecture, or second and third hand sources. Even then I've seen him leave out important facts that change the whole nature of an accident. Still, it would be unfair of me to bring up all these criticisms without citing specific examples from "American Caving Accidents, 1991."

I would first like to cite Knutson's article "Be Warned; the Figure-8 is Dead." Knutson's logic seems to be flawed due to an apparent lack of knowledge regarding the behavior and character-

istics of at least two devices: the carabiner break bar, and the figure-8. The carabiner break bar setups have been long outdated for two important reasons involving the gate. First, the unnatural load applied to the carabiner gate by weighting it laterally. Second, the danger of a gate being forced open due to accidental contact with a lip is too great which was the main reason for its going out years ago. Knutson has made a severe mistake by endorsing (by mere mention) an outdated device as an alternative to the figure-8.

Knutson argues that the eight should be banned because many rescue groups have banned its use, and that it causes permanent kinks in the rope. I can understand why rescue groups would move away from the figure-8. The rack is simply more adept at handling the loads and moments placed on it in rescue situations. The twist the figure-8 puts in the rope does cause the load it suspends to spin. This is something you don't want to do with a stokes, but the demands placed on the figure-8 during a rappel are entirely less demanding. Some simple safety precautions can still be used: don't use one if you weigh more than 150 pounds, and don't use one on drops much over 100 feet. In regards to the damage to the rope caused by the figure-8, I think the rope manufacturer would be the best judge of the severity or importance.

Knutson's biases are displayed in his objections to the use of bottom belays. He completely disregards the multitude of examples where it did or could have saved someone from injury or death. According to the "American Caving Accidents, 1991" report an accident occurred where a woman suffered a broken foot and ankle, dislocated toes, three fractured vertebrae, and bruised ribs and sternum after a 100 foot uncontrolled unbelayed rappel (May 12, pg 355). In the same issue a man was spared serious injury by a belay after a 110 foot uncontrolled rappel (Dec. 28, pg 354). Knutson goes on to criticize the use of bottom belays saying, "I think a caver who requests a bottom belay should not go down, but should exit the cave and get his/her techniques in order."

I do not understand the gross inconsistency of Knutson's opinion. How can he condemn a practice like bottom belaying when it obviously has its merits. Anything can happen outside a caver's influence that could cause an uncontrolled rappel (i.e. induced unconsciousness), and if you learn anything from the accident reports it should be that accidents happen. Belaying can save and have saved lives. I understand the risk of rockfall, but many things can be done to address this issue. Most common is to belay from under a protected overhang. Another possibility is to rig a belay redirection in the rockfall zone using some sling and a carabiner while applying tension from a safer vantage point. Two things that should be noted are that belays do become ineffectual on drops longer than 400 feet, and unprotected blind pits should be bounced.

I have only one example of where the facts of an accident were misrepresented and left out; still, how do I know they weren't in other cases? The case of Fern Cave, AL (Mar. 11, pg 343) shows what advantage Knutson has with hindsight. I am not defending the actions of these cavers, but Knutson had many of his facts wrong which helped explain their actions. The primary cause of this accident was failure to be properly informed. The rest of the mistakes were made under stress with the possibility of an injured caver. Knutson failed to mention that Dave Colatosti was an EMT, and that he decided to descend with emergency supplies. Also he misrepresents the group saying they were there with the intention of doing a waterfall drop in cotton and trash bags. I get the impression they would have preferred to have dropped at the dry rig point. Knutson should have been better informed for his analysis. I also object to the inappropriate comment "As you read this do you get the impression they were all going to end up at the bottom of the pit?" It was snide and would have been better left out of the analysis.

To conclude I would like to propose alternatives in the production of American Caving Accidents that would help the report be more meaningful. Analyses should be constructed from first hand accounts with interviews. They should lack assumptions,

irrelevant commentary, or judgement by the writer. The report should be reviewed by committee to ensure it is objective and other perspectives are considered. Condemnation of techniques not proven to be inappropriate in most or all situations should be reserved for the Safety and Techniques Committee.

Mark Eisenbies

NSS 32075

Contextually Ambiguous by Nature

KD to JS: "You can feel it under there, it's hard! Play with it some more!"

LB to Ton-80 crowd: "C'mon Pam, Do it!"

MF: "Sitting on Mark gives me another six inches."
ME: "No. At least eight."

CZ: "How many cavers drive Mercedes?"
ME: "That's a BMW."
PK: "Apparently not many."

KD to SR: "Yeah, Jen likes hard-ons."

GD to WP: "I've got one of those tools and mine's stiff too!"

NS: "Dave, when did you get your first tool?"

JS: "Nancy, how many have you worn out?"

GD: "He has the most usable tool."

JR: "Yes, It's very small and all in one place."

From the Signout

The VPI Cave Club logged 4,420 hours in 152 trip from November 19, 1992 thru November 5, 1993.

CAVE	PARTICIPANTS		COMMENTS
Starnes	L. Britt E. Devine W. Pirie J. Pugh L. Burch S. Wells B. Cosby	B. Huppert G. Maas A. Heaton K. Snyder P. Hess S. Knapp J. Fagan	300+++ walking virgin
Murder Hole	B. Steier B. Cosby A. Hungerford	B. Penhallegon J. Maynard	This comment thing is just plain dumb.
Norman	S. Knapp S. Ludeke	T. Spero	The water is not that cold after your legs go numb
Starnes (it won't be pretty) (L.B.)	L. Britt	S. Wells J. Pugh	It wasn't pretty Virgin's still squealin'
Starnes	S. Knapp A. Stirgwolt	L. Burch S. Wells	Four shit Degrees down.
Dead Air Boxwork Crystal	A. Stirgwolt	W. Pirie R. Geisler	Simply beautiful.
Tawney's	B. Cosby J. Savage M. Eisenbies	B. Steier S. Winslor & Others	Emerald room under water?!
Tawney's	M. Horne G. Frohn J. Fulmer	J. Bellmor C. Bern	"I don't think I can handle this/another day in cavopolis" "I think I'll go down into the ground/I've gotta pocket full of Carbonite."
Starnes	J. Savage K. Digby	S. Wells D. Colatostti	UGH
Greenville Saltpeter	B. Keller P. Kirchman J. Wallace Kevin	L. Colby M. Fisher D. Beckley Trudy	Well, I've only seen the entrance from the inside- Maybe it's over there.

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