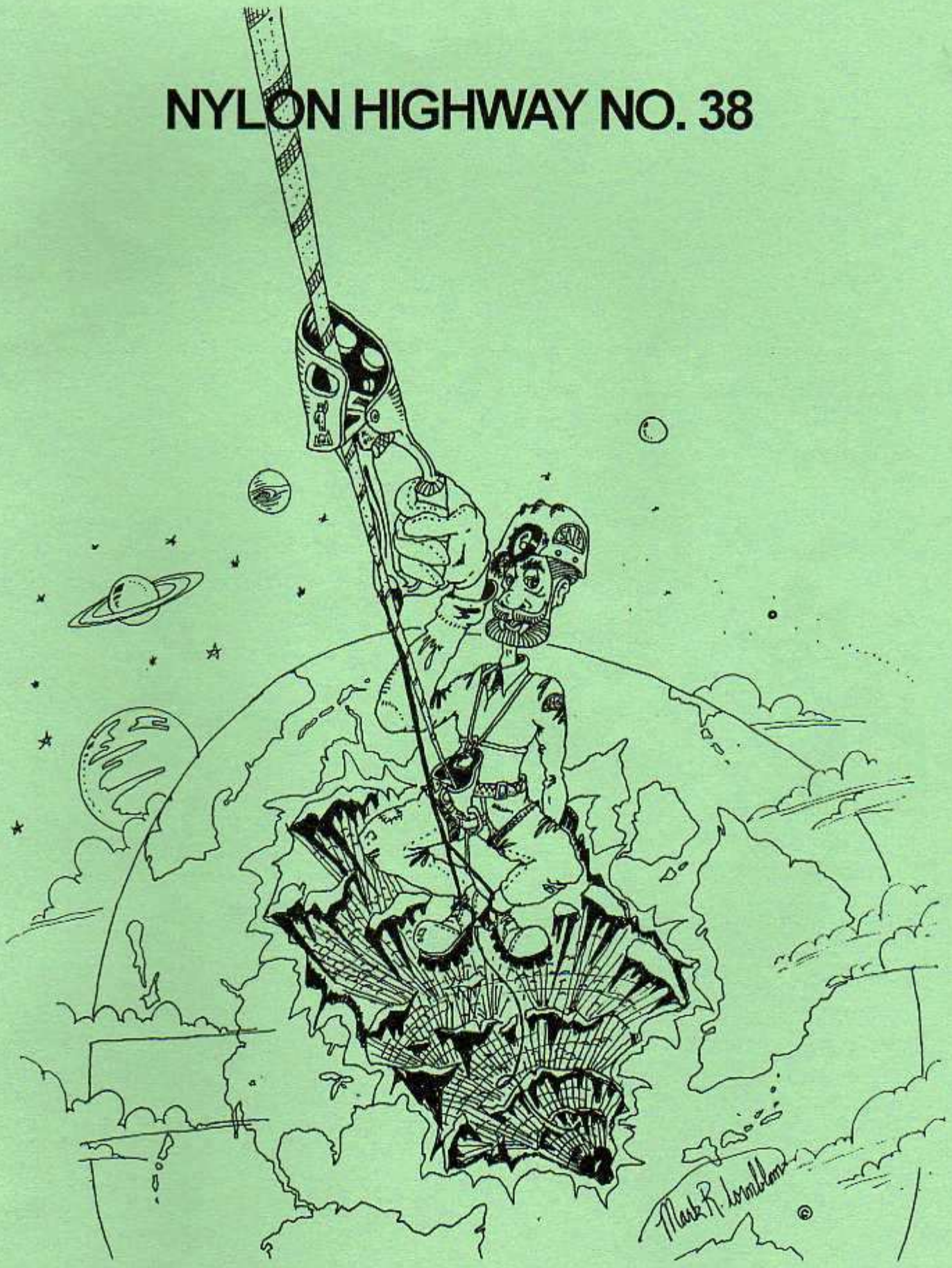
NYLON HIGHWAY NO. 38



...ESPECIALLY FOR THE VERTICAL CAVER

NYLON HIGHWAY

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FEATURE ARTICLES

Section Business - The Section voted to purchase or have built a large display timer clock for the vertical contests. Bill Bussey was appointed Chairman of the fund raising committee to raise money and help defray the costs. Section member Mike Newsome has agreed to construct the clock for the cost of materials. Please send all donations to Bill at 120 Manhattan Ct., Cary, NC 27511-3258. Make Checks Payable to the Vertical Section.

OFFICERS

Please send articles, art and other mateial for publication in the *Nylon Highway*, exchange publications, payment for advertising run in the *Nylon Highway* and related correspondence to:

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Subscription, renewals, requests for back issues, address changes and all correspondence that doesn't have a specific reason to go elsewhere, send to Gary Taylor. Annual Vertical Section dues are $5.00. **Make checks payable to the NSS Vertical Section**

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THE NYLON HIGHWAY

The *Nylon Highway* is published by the Vertical Section of the National Speleological Society on a semi-annual basis pending sufficient material. Vertical Section dues are $5.00 annually. It is the intent of this publication to provide a vehicle for papers on all aspects of vertical caving. All submitted articles containing unsafe practices will be returned to the author. With this issue, the Vertical Section has over 1100 members with a mail out of over 1200 copies of each issue.

- **Front Cover:** "Cave the World" by Mark R. Tomblom
- **Back Cover:** "Olivia Whitwell in Arch Cave" Photographed by Brian Bischoff, Drawn by Linda Heslop

Editor's Column

by Maureen Handler

Well, it is significantly past that time of year when the Convention issue of the Nylon Highway is due to the membership. I hereby issue the mandatory apology for the tardiness of this issue. 1994 has been a year to beat all. Besides the time flying by like no other year, I have been extremely busy trying to start a new business. The slow start to my business mandated that I also work a second job, just to pay the bills. This has left no time for recreational activities such as caving and working on the Nylon Highway (if one calls editing a publication recreation). In addition to all of this, I was elected to the NSS Board of Governors (thanks for all your votes), which also helped consume what little free time I have had.

So, now I've finally entered all of the current articles in my "next Nylon Highway" file and am once again ready to begin the task of editing and layout. I appreciate all the great material that I have received from the membership. I do, however, ask that, if you prepare your article on a computer, please send me a disk of the text. This saves a significant portion of time that I would have to spend retyping the article. Also, if you have color photographs that could accompany an article, send me the negatives and I will have black and white photographs made to be reproduced in the magazine. I extend many thanks to Jason Stallman of Marietta for his invaluable contributions in preparing great quality photographs to be used in the Nylon Highway. This issue also contains an article by Bill Bussey on his equipment "Picks and Pans". Hopefully, this will become a regular addition to the Nylon Highway to help people evaluate new equipment on the market.

I was able to make it to the NSS Convention, in Brackettville, Texas this year. Besides being incredibly hot, the Texas cavers threw a fantastic, week long party. While in Texas, I was able to visit a couple of classic Texas caves that included some sort of vertical work. Devil's Sinkhole, a 130-foot open air pit is located 70 miles north of the convention site. This cave has been closed since 1978, but was opened for the convention. The pit has a nasty overhanging lip no matter where you rig from. Since the rig point was Bill Steele's Volkswagon Vanagon, almost anywhere along the perimeter of the opening was fair game for ropes. Six ropes were rigged when I arrived and approximately 50 cavers entered the pit throughout the day. A number of people were having difficulty negotiating the lip both during rappel and climb, but thankfully, there were no incidents that caused injury or could not be overcome with a little help from the top. The extremely photogenic nature of the pit made enduring the stench of bird guano worth the effort.

The following day, I went to Honey Creek Cave near San Antonio. This cave is a 2 mile, swimming through trip with wet suits, fins and flotation. While the natural cave is entirely horizontal and takes 5 to 7 hours to swim from the man-made entrance to the natural entrance, the drilled entrance is something to experience. Up to 4 cavers at a time are lowered on a 1/2-inch steel cable to the cave floor 140-feet below. A 30-inch diameter was drilled to a level of 60 feet below grade. The 10-inch pilot hole, drilled all the way into the cave, was then blasted out to 30-inches for another 40 feet where it intersected a 40 foot dome in the cave. I have never been lowered into a cave by a tractor before, so it was an interesting experience. From the landing point on, it is basically a swimming cave to the natural entrance. Definitely a worth while trip is you can swing it on a trip through Texas.

Thankfully, both of these trips were so enjoyable, that the memory of them has been sustaining me through this period of no recreational caving. As soon as I receive more articles, I will start immediately on the next issue of the Nylon Highway.

A Dozen Ways to Stay Alive While Vertical Caving

by David McClurg

Here are 12 sure fire, tried-and-true ways to add safety and sanity to your vertical caving life. The list includes such necessities as a seat harness and chicken loops, but extends to safety loops, an etrier on a safety Jumar, hand lines, rigging runners, plus several more that will help you live to tell your grandchildren all about it.

Item	Purpose
Sewn Seat Harness	Basic for safety and comfort
Chicken Loops	Keep you on the rope
Safety loop	Tie in, Prusik knot, learning knots
Spelean shunt	Safety and resting
Rigging Runners	Position or conserve main rope
Figure 8 Loop in Rappel Line	Auto stop and loop to stand in
Etrier/Hero Loop with Jumar	Crossing lips and negotiating squeezes
Ropewalker Self Start	Help for the last caver out
Caver's Sling (10' of 1" sling)	Emergency seat sling, chest loop, hand or haul line
Eight mm Hand Line	Short rappels, scrambling, traversing
Plastic Garbage Bag	Staying alive, period
Universal Safe Caving Rule	Don't hurt yourself!

With that preview, let's take a closer look at each:

• Sewn Seat Harness

A seat harness that fits properly is the first requirement for safe and painless vertical caving. A good seat harness is sewn at several overlapping points. So if it breaks, one or more parts of your anatomy is still attached to the line.

In other words, you don't come off the rope. This could happen if an unsewn seat sling like a diaper sling breaks. (Incidentally, by definition, slings are unsewn or untied, harnesses are sewn or tied.) Slings made of one-inch webbing have been known to break. Probably these were not new slings, but some that were old and tired. But, why take a chance?

That's why I recommend the one-inch webbing diaper sling only for emergencies, not for every day use (see caver's sling below). A diaper sling should be backed up with a waist loop made from your safety sling (see that below too). The moral is, if you must use a diaper sling for regular use, don't use one-inch webbing, use two or three inch instead. They are more comfortable too.

Back to harnesses. There are two important things to keep in mind when selecting a seat harness. First off, it needs to fit well and be comfortable on you. You're going to be spending quite a lot of time sitting, standing and squirming in this contraption, so get one that's right for you.

It's best not to buy your seat harness by mail order. If you have to, be sure you can return it if it doesn't fit you. It's better to go to a store or supplier when you can actually sit in the harness while hanging on a line.

Second, the harness should have a low attachment point for your locking carabiner or screw link (maillon rapide). Preferably, that point should be at or below waist level. This is because when you come to technical maneuvers, like change-overs, knot crossings or rebelays, you have to take off and put back in the line in a carefully prescribed sequence, all the various ascenders, descenders, carabiners that attach you to the rope. A low attachment point makes this easier by keeping all these items from jamming into each other.

From a safety stand point, this is actually more serious than you might imagine. Change-overs and rebelays in particular, can be either very difficult or nearly impossible if your seat harness centers your rack way up on your chest instead of down around your waist.

A final word on the carabiner for your seat harness. Buy the strongest one you can. Your life depends on it. And get one big enough to stuff in all the extra loops, slings and carabiners you'll be using.

• Chicken Loops

These are the small sewn loops that go around your ankle to keep your feet from slipping out of your ascender slings. For either the Gibbs ropewalker or the Mitchell system, they are mandatory. for the Texas or Frog system, the jury is still out.

Frog system advocates say they never use them, especially if they have a larger single stirrup for both feet. And, according to Frog users again, when you need to pass rebelays with European style rigging, fighting with chicken loops is the last thing you want. However, for ropewalker and Mitchell systems, they are so essential as to be an integral part of the system.

• Safety Loop

This is five feet of six or seven mm Perlon accessory cord. Usually it is tied into a loop with a grapevine (double fisherman's knot). It has many uses in vertical caving. ■ To tie yourself in when belaying or working near a lip. ■ To serve as a rigging runner to reposition the main line. ■ To tie into a Prusik knot for use as an ascending sling. ■ To provide redundant safety protection between the knee Gibbs and seat harness in a ropewalker system or between the bottom Jumar and the seat harness in a Mitchell system. ■ To practice knot tying while waiting at the bottom of the drop for your turn to climb. ■ To use as a waist loop to back up a one-inch diaper sling.

Vertical cavers will be well advised to carry one, if not two, of these loops with them in their vertical packs. They will soon become indispensable.

• Spelean Shunt

This is a Gibbs ascender with an oval carabiner fitted over it. The carabiner pivots on the Gibbs pin and becomes a handle to let you release the Gibbs when your full weight is on it. Tying your safety loop to the carabiner gives extra leverage and makes it even easier to pop the Gibbs free.

The shunt's purpose is to protect you when rappelling if you should lose control or get hit on the head by a loose rock. It keeps you from sliding down the rope out of control to certain injury or worse. The shunt is connected to the carabiner on your seat harness via a loop made from six or seven mm Perlon cord.

It's also good for those times when you want a safe on-rope resting position, in addition to or instead of locking off your descender. If you carefully selected your seat harness for comfort and good fit, you should be able to sit for long periods if necessary for emergencies, minor equipment repairs or those photographers who want just one more shot.

To get double duty from the shunt, some ropewalker fans use it both for rappelling and prusiking. When ascending, the shunt rides above the Simmons roller or chest box. To rest, you just shove it up to lock it and sit down in comparative comfort.

• Rigging Runners

When rigging, runners are a convenient way to position or conserve the main rope. For example, you may want to place the main line away from a lip, out of a waterfall, clear of a sharp edge or in a better place to get on and off rope. Runners also conserve rope in situations where the alternative is to wrap the main rope several times around the anchor. They can help to provide back up anchors, a feature of all properly rigged drops.

Usually, runners are made of one-inch tubular nylon, either 6-feet (single) or 12-feet (double). A rigging party often has three or four of these in their bag of tricks. Remember, always attach the main rope to the runner with a carabiner or pulley, never directly to the rope to avoid nylon rubbing on nylon.

• Figure 8 at End of the Rappel Line

Every experienced vertical caver knows that you always tie a knot in the end of the rappel line so you don't come off the end of the rope if that new pit is deeper than it looked (or you brought the wrong rope!).

A refinement on that life-saving tip is to make the stopper knot a figure 8 loop instead of just a plain figure eight or overhand knot. With a loop, you have a convenient stirrup to stand in while you change over to your ascending gear or try to maneuver across to a convenient ledge.

• Etrier/Hero Loop on a Safety Jumar

A safety Jumar is part of the vertical kit of all experienced vertical folks. For example, it's indispensable for hauling yourself over tricky lips. You attach it on the rope above your top ascender. Then you clip the end of the sling on the safety

Jumar into your seat harness with another carabiner.

Replacing the simple Jumar sling with a short etrier -- four or five feet of sling with two or three loops -- adds new functionality. Now you can select the length you need by clipping into a different loop in the etrier.

You can also use it for a foot loop assist in a tight squeeze. It's effective in both vertical squeezes, like tight fissures, and horizontal squeezes. First, have a fellow caver run a rope or hand line through the squeeze (if there isn't a line there already) and tie it off securely on the other side. Then, attach the Jumar and put your foot in one of the etrier loops. Depending on the fissure or passage, you may need help from another caver to get your foot into the loop. This new-found foot hold is often all you need to pop through a tight one. It's certainly worth a try.

By the way, if you make this mini-etrier with half-inch or nine-sixteenths-inch sling, you have what our climbing friends affectionately call a hero loop.

• Caver's Sling & Locking Carabiner

This handy item is simply 10 or 12-feet of one-inch sling with a locking carabiner. I have always advised cavers to carry this sling and carabiner in their cave packs on every trip. Like the Perlon safety loop, the sling has many uses. ■ An emergency diaper seat sling, ■ A chest loop for carabiner or chest box, ■ A short hand or haul line, ■ A longer hand or haul line, by tying several slings together (everyone on the trip has one remember), ■ An etrier by tying figure-8 loops, ■ Or rigging runner to tie a rope, or yourself, to an anchor.

• 50 Foot, 8 mm Hand Line

On every caving trip, at least one member of the party should carry a hand line. After many years of experimenting, we now carry a 50-foot length of eight mm Perlon accessory cord. This diameter cord test at about 4,000 pounds, for a safe working load of about 500 pounds. This is strong enough for most hand line uses, if only a single person loads it. Also, avoid stressing it with sudden loads like jumpy rappels or too much slack in a secondary anchor that might pull out.

A hand line's multiplicity of uses includes short rappels, top belays (static or snug, not dynamic), traverses or providing a safety line for scrambling down slippery slopes. You can reduce the margin of error when climbing steep pitches with a hand line. Clip your safety Jumar onto the hand line and attach it to your seat harness (or emergency diaper seat sling made from your caver's sling). As you climb, carefully slide the Jumar up as you reach each secure position.

• Plastic Garbage Bag

Waiting at the bottom of the drop in a wet, windy passage can chill the bones of the most macho vertical caver. A simple solution to help stave off hypothermia is the deliciously low-tech garbage bag. The size about 2.5 by 3 feet works well. Cut a hole for your head in the top center and slip it on. Be sure to put your helmet back on to help keep your head warm and dry. If you need to move around much or use your arms, you can cut two more holes in the corners, but be careful not to tear the entire top seam open or it won't work as well. If it's especially wet or cold, a garbage bag folded up inside your helmet takes up zero space and might just keep you alive some day. It can also double as an emergency rain poncho on the way back to the car.

• Universal Safe Caving Rule: Don't Hurt Yourself!

This golden rule is universal and recognized worldwide. We've heard those three little words spoken in Czech, French, Schweitzer Deutsch, Russian, German, Ukrainian, plus English of several varieties, including Yorkshire, Australian, BBC and New Zealand.

If you've ever been part of a cave rescue or taken rescue training, you've had this lesson indelibly imprinted on your backside. You've experienced first hand the massive amount of time and effort it takes to get an injured person out of a cave safely.

So never forget that a foolhardy or stupid action on you part, endangers no only you but all the other poor souls in the cave with you. If you go ahead and hurt yourself, they've got to get you out. So I repeat once more for the slow learners -- Don't hurt yourself.

Think Before You Rappel Through A Tight Spot

Reprinted from Ground Hog, Shenandoah Valley Grotto, April 1994

Recently, our Shenandoah Valley folks found an exciting but tight little pit. The pit became constricted about 7 feet down. They rigged the pitch so that the rope dropped through the widest point in the constriction. The caver put on a rack and carefully slid down. He was equipped according to our standard practice, with a seat Jumar ready on a Jumar tail and a Texas Jumar packed at the top of his cave pack.

As his butt slid into the constriction, the caver experienced truth. He locked off his rack. He was further chicken lest something slip and he hang himself to death on his helmet strap, so he loosened his helmet. Now the caver was neither in any discomfort nor in any immediate danger, but he had a puzzle to solve. His seat Jumar might or might not be accessible. His other Jumar was in the pack which now rested against his ear, but there was no possibility that he could get the Jumar sling onto either foot. He might have been able to put the seat Jumar on the rope and haul himself clear with his arms, but that would not have been easy.

Fortunately, the caver had the benefit of a back up ascending system -- another caver was standing above him. This caver grabbed the rope and hauled him out of the pit hand-over-hand. The caver then put away the rack, hooked up the Texas system and gingerly down climbed in three-inch increments, ensuring that he could reverse the process as he inched through the constriction.

You can rappel into something that you can't climb out of. I speculate that, if you can down climb through something with Jumars, then you have a reasonable hope of climbing out of it with the same system. I am marginally confident of this and would operate on this supposition if other circumstances were favorable. I am entirely confident of the obverse: If you can't down climb through a constriction with Jumars, then you can't climb out of it with Jumars. This is a no-go gauge that should certainly be exercised whenever there is doubt.

If you wonder whether you can climb up through a vertical constriction, then don't rappel into it! Put a suitable ascending system on the rope (no foot Gibbs, please!) and carefully down climb, making sure that you can reverse the process at every juncture. In the absence of the second experienced capable caver (as in this instance), it would be prudent to have a hauling system prerigged on the rope with somebody at the top who knows how to operate the system. If distance is involved, then establish clear signals for operating the hauling system before you descend.

You are in error when you feel that you are so experienced or well-equipped as to be immune from error. If you proceed respectfully, then the cave will sometimes write you a warning ticket for one error. Correct the error, be happy and thank the cave for adding to your wisdom and your humility.

Editor's Note: The first caver down the pit made one crucial error. When rappelling any pit, but especially a tight one, you should never wear your pack on your back. Having the pack on your back can pull you over backwards on a free rappel and makes it nearly impossible to access your equipment in case of an emergency. Your cave pack should be tethered to your seat carabiner when rappelling and climbing. During a rappel, all of the weight of the pack will be on the rack and during the climb, the equipment will be much easier to access. I also apologize for not naming the author of this article. I copied it from a reprint in the D. C. Speleograph, June 1994 and the author was not named in the reprint.

I'm often asked my opinion about various pieces of vertical gear. Cavers want to know if I've actually used it, but also what I've heard about it as well. Sometimes I'm even fortunate enough to receive some gear from the manufacturer to test and hopefully get around to writing about.

In this long overdue article, I'll give my opinions on a various assortment of vertical gear I have owned and sometimes used. These opinions are strictly my own and most assuredly not those of any other persons, the Vertical Section, the NSS or other organization. However, I reserve the right to paraphrase and give credit to what others have said. My opinions are entirely subjective and biased. They may or may not offer any solid explanation. Sometimes things just aren't "fun" to use. If that is the case, I'll state such. This may not be fair, but I'll try to be as diplomatic as possible - maybe. Opinions expressed do not constitute endorsement or condemnation. I am not responsible for any injury or death which occurs when using any equipment described. Pick means I like it, Pan means I don't. Any pans or harangues are not meant to be personal attacks on the manufacturers, inventors, or anyone else who happens to like the equipment. It's just the way I see it. With all that out of the way let's get going on:

Bill Bussey's

Picks and Pans

Pick: SSP Rope

The question I've been asked most often is "Is SSP rope any good?" The principal reason for this is that is sold to NSS members at a very good price when compared to PMI, Bluewater and other brands. While I don't own a piece of SSP, I've used rope owned by others both in and out of caves. Drops include the New River Bridge for two or three years in a row, and various pits and caves of TAG and the Virginias. I've never had any problem with it, nor have I heard of anyone having any problem with it. It seems to handle and perform well, with normal spin and stretch characteristics. It seems to be comparable to other ropes in abrasion resistance. The manufacturer claims certain advantages, including better wear and handling due to having the individual fibers in the fiber bundles of the braided sheath of the rope run parallel to the length of the rope instead of to the fiber bundles. You can see this if you look closely and compare SSP with other ropes. While I'm not sure if this has any real advantage, it at least shows the manufacturer or designer was thinking. I'm always impressed when people think and work to improve things.

Pick: PMI Rope

I do happen to own and use a lot of PMI rope. PMI generously supports just about all organized rope climbing contests at caving events, and I've been lucky enough to win a bit over the years. Like the Eveready bunny, PMI keeps going and going. Though notorious for being stiff due to it's tight braid, this is one of the reasons it is hard to wear the stuff out. I've never known any caver to have problems tying knots with it due to the tight braid. Abrasion resistance (both wet and dry) is probably tops, (it's been proven in tests). It also spins and stretches less than any other rope I've used. The only out of the ordinary negative I've seen or heard is when Section member and window washer, Steve Davis, showed me several pieces which were stiff as PVC pipe after being used for a good while on the job. However, I think this was due to dissolved solids from the spills of the window washing operation permeating the rope which caused internal friction to increase. The tight braid probably exaggerated this. So called "Dry coats" used recently by rope manufacturers may solve this problem. While other manufacturers years ago abandoned caving as little more than a token market, PMI still seems to consider the caving community a market worth courting. Thanks PMI.

Pan: Bluewater II Rope

I also own an older piece of 300 foot length of Bluewater II rope. Though the workhorse rope in my early days of caving, it was always a bit more stretchy than friend's lengths of PMI. As it got older, it got even more stretchy. One could climb 8 feet or more before getting off the bottom of a 160 foot pit. One time at Conley Hole in Tennessee it stretched so much that Bruce Smith became concerned that we were at the top derigging the rope while he was starting his climb out. The rope is easily glazed when compared to other ropes as well. The rope also seems "drier and flaky" than other ropes with a similar amount of age and use.

However, this could be due to washing over the years. Finally, Bluewater seems to have completely abandoned the caving market to the larger and more lucrative rock climbing and rescue communities. Too bad -- because I think we're worth it.

Pick: The G.O.S.H. Ascender

If only a certain US chief executive from Arkansas were as good as these little wonders from the same state... R.C. Schroeder told the story of his Gated Open Side Housed (G.O.S.H.) cams in Nylon Highway #36. I love mine, it having replaced a regular Gibbs as my principal knee ascender on my single bungie Ropewalker system. I have yet to try it out on my foot, even though R.C. claims the ascender was designed especially for foot attachment. The ascender is extremely well machined. The craftsmanship is superb being made out of shiny 6061-T6 aluminum. It stays shiny even after multiple wet cave trips. It even features a flying bats design for tasteful ornamentation. You seldom see ornamented cave gear or anything else this day and age.

More importantly the ascender is quick and easy to get on and off rope. Because it doesn't come apart, the ascender only takes one or two hands to attach or remove from the rope, unlike the Gibbs which takes "three". It works well in wet and muddy environments, and is a joy on those long free drops. R.C. has constantly refined the ascender. He recently recalled the ascenders to replace the cam with a longer one to prevent slippage under extremely wet conditions. I never experienced this, even on a couple of soaking climbs of a partially plugged Mystery Hole in Tennessee. This all goes to show R.C. is still thinking.

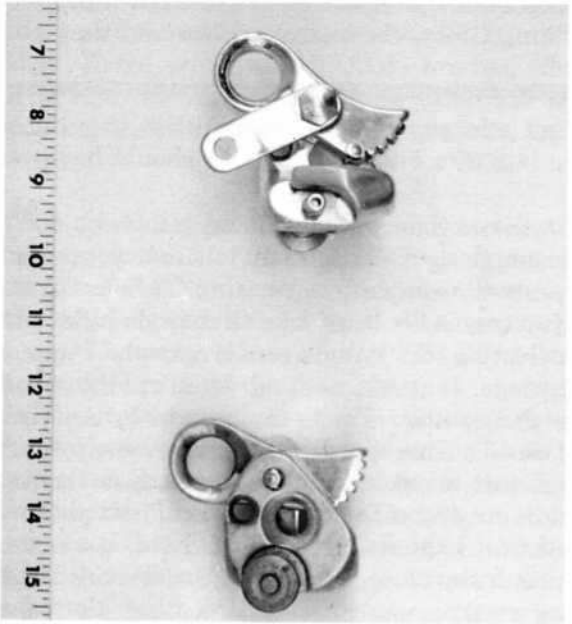


Figure 1 - The G.O.S.H Cam viewed from both sides.

The ascender does bend the rope a bit more than other ascenders when loaded. However, this has not appeared to be a problem as the slight bend straightens out completely when the rope is again loaded. This bending is probably about as harmful to rope as tying a knot in it. Also, I wish he would go back to offering the optional spring loaded quick release pin. He said he went to the push pin type quick release pin for safety considerations on double bungie rigs, but it never caused me any worry or trouble with my single bungie rig. It was somewhat faster to get on and off as well. Also, be sure to use the correct right or left handed model based on which foot or knee you attach the ascender to. If oriented improperly, the pin can hurt when it bangs against the knee or leg. Of course that is why left and right handed models are available. All in all, the G.O.S.H. cam is a dandy.

Pan: The Gibbs Hinged Ascender

My biggest pan goes to this excuse for an ascender. It looks chunky and clumsy, and it performs even worse. Its a lousy design, heavy, complicated, and tough to operate. It's as bad a design as the original Free running Gibbs is good. It let me down at the bottom of a 150 foot pit when the pin would not fit all the way back in for the balls to lock. I think the spring coil moved out of place obstructing the hole. Even with pliers and a screwdriver, it could not be made to work there. Fortunately, I had brought another foot ascender along just in case. I don't like new vertical gear that fails underground in an unusable mode. It was also very difficult to remove the spring outright later on.

The manufacturer obviously did little cave or caver testing when they designed this beast. A prominent vertical caver said words to the effect of "I wish they had let us try it out before they started making this". I'm not sure whether he likes it or not. While it seems like they were trying to emulate the venerable cast Jumar ascender, they

Figure 2 - The Gibbs Hinged Ascender rigged as a foot cam.

did it in all the wrong ways, and on the wrong type ascender. The manufacturer would have been (and still would be) much better off studying or buying the rights to the G.O.S.H. cam and making it instead. R.C. at least did his homework. The G.O.S.H. cam is what the Gibbs Hinged Ascender should have been. I can't say enough about this turkey.

Pick: The Free-Running Gibbs Ascender

Though it takes "three hands" to attach and remove from the rope, the venerable, free-running, quick-release, pinned Gibbs works well. It made the Ropewalker system possible. The Ropewalker's efficiency, safety, and ease of use opened up deep vertical caving to almost any caver in even mediocre physical condition. This versatile ascender keeps on working when wet, muddy, or beaten up. With little practice they can be put on in total darkness. If it slips, usually scraping the inside of the shell with a sharp metal object will roughen up the rope contact area enough to get out of the hole. It is an elegant, simple, functional design. If

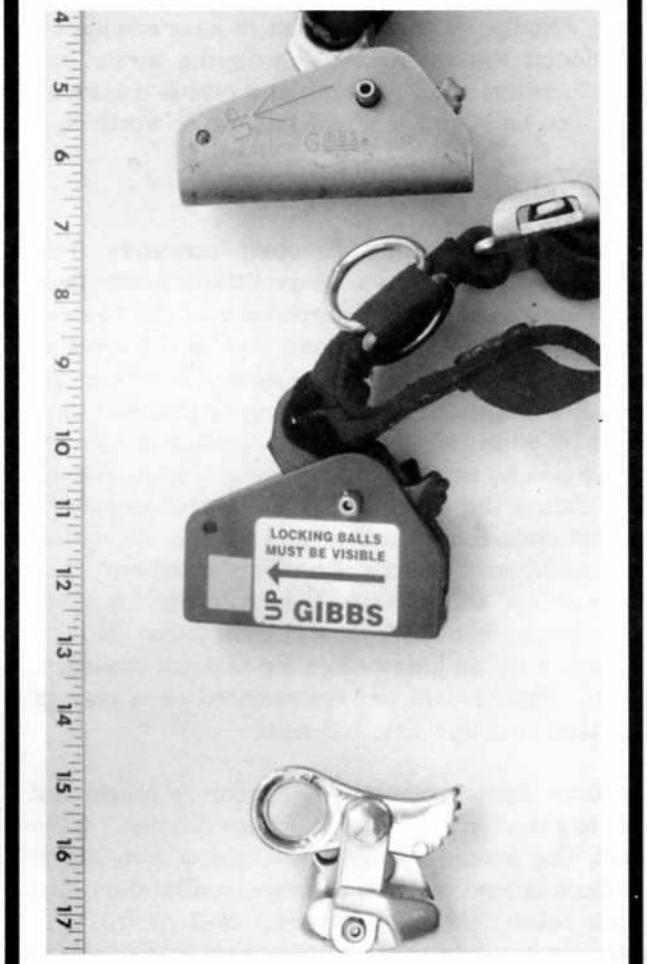


Figure 3 - Comparison of the Free-Running Gibbs, the Hinged Gibbs and the G.O.S.H Cam

it didn't win any design awards when introduced in the late 60's and early 70's, it should have.

I tell everyone who asks, and a lot who don't, the same thing Bill Putnam told me years ago, "Buy only the simple free running Gibbs". On the foot, you can easily learn the "Gibbs side kick," and when floating, the bungie cord works the same as the spring. It needs nothing when riding on top of the chest roller. Try to find one with no plastic on it at all. The bonus is they are the cheapest. Though just about impossible to get these days, if you can find any of the old non "hard" coated cams, grab them. I think the so called "hard" coat cams wear out faster than the old non-coated ones. After having worn through the hard coating, the worn surface is usually sharp and can in some cases actually nick rope fibers. The manufacturer would do well to again sell the non-coated cams. I'd much

rather deal with aluminum oxide than periodically nicked rope.

For versatility, it's hard to beat the Free-Running Gibbs. It was designed and perfected with input of cavers, and the homework - or should I say pit and contest work - shows.

Pick: Iowa Safety Rack.

Many Nylon Highway readers outside the Midwest US might not know about the Iowa Safety Rack developed and manufactured by Lowell Burkhead 2611 Alderman Rd. Springville, IA 52336 (319) 854-6650, but you should. He let me try out a version to rappel the 80' (approximately) entrance culvert at Coldwater Cave in Iowa on the way home from the 1988 NSS Convention.. This compact rack worked so nicely, I later bought one planning to write an article on it. Well, better late than never!

What strikes me first about the Iowa Safety Rack is how well it is machined. The hand craftsmanship is better than any small quantity (he's sold fifty of 'em) manufactured pieces of caving gear I've seen. Not even R.C. Schroeder's well made G.O.S.H. ascender beats this rack in craftsmanship, and the new titanium racks aren't even in the same league. The fit and finish is top notch. The attachment loop is made in a compression fixture, so that the bend is compressed on the inside, but not stretched on the outside. It is then welded. There are a host of little touches which add up into one nice rack. Lowell takes his time in crafting these lifetime guaranteed racks, and it shows.

The bars are solid pre-grooved rectangular aluminum instead of the normal rod variety. I understand that the grain of the aluminum ends in the edge of each bar instead of being parallel. This is like using the end of a 2X4 for friction instead of the side of the piece. Also he chose the aluminum type based on wear properties, instead of hardness properties. This all means that the bars don't wear nearly as fast as regular aluminum bars. They don't call it a "Safety Rack" for nothing. You can rig this rack either forward or backward and still be safe. The bottom bar screws onto the free bottom leg. With this in place, there is no way for the rope to come out of the rack. This is as close to a "fool-proof" rack as I've seen. It also means you can't remove any bars to reduce friction.

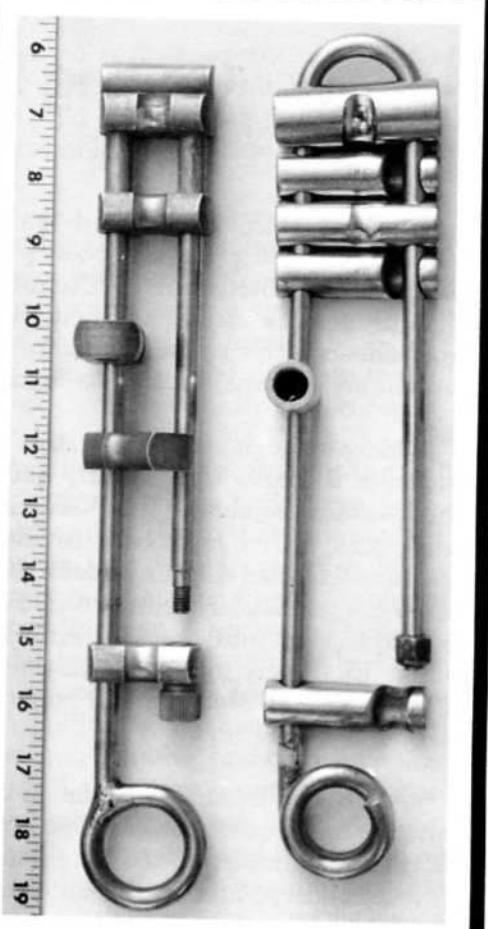


Figure 4 - Comparison of the Iowa Safety Rack with the Standard SMC Rack

However, with five bars being standard on a short rack, you really don't want to. Also, the bars can move only a limited distance when loaded with rope.

The one complaint I have with this rack is that it really isn't "fun" to use. With the locked in place bottom bar, you basically have to control rappel speed with the brake hand. There is some friction control with the fourth bar, but it isn't much. Still, the rack is designed for shorter, confined space drops, where one isn't going fast enough to enjoy finger tip control. Also, beginners generally don't want to drop quickly the first few times anyway. Taking the screw lock off the bottom bar so it would be free to move up and down the legs would increase fun considerably. Lowell says it is a comparatively easy job to do this. As a reasonably experienced rack user, next time I'll leave the screw lock off.

Size-wise, the overall length of the rack is 13 inches. Width from left side of left leg, to the right side of right leg is 1 1/2 inches. There is a 15/16" spacer between the top and 2nd bars. Lowell sells these individually numbered (my "number" is AU) babies for $50 each. Call or write first, as it has been a few years since he had made up these (he still has parts ready to go, however) and they are not available for immediate delivery.

Getting Myself Out of Lechuguilla

by Peter Jones

On May 16th, 1993, I had the misfortune of following in Emily Davis Mobley's footsteps and becoming a fallen man of Lechuguilla. While walking down a slope, my right foot slipped out from underneath me, causing me to fall and rotate around my left ankle and thus breaking it.

Oddly enough, it was in the same general region of the cave where Emily had her accident, the Western Borehole. Also like Emily, it was a freak accident. I have been caving for 26 years and had considerable experience in Lechuguilla, being the trip leader for my group for this particular expedition into the Western Borehole. But unlike Emily, my injury was to the ankle, not the knee, which allowed me the possibility of a self rescue.

As this is meant to be an article about the vertical techniques I used in self-rescue, I won't elaborate too much on the long hours of crawling I had to undergo to effect my exit from Lechuguilla. Suffice it to say that I have re-named the Western Borehole the S&M Crawlway, stealing it from another so-named part of Lech. Two miles on hands and knees is enough to turn anyone's flesh to hamburger.

I was fortunate in that the location of the break (the lower fibula) was such that I was capable, after splinting, of crawling along unassisted. I had good knee pads, relatively level ground and a lot of soft gypsum sand to crawl on. Most importantly, I had 8 other team members there to help me whenever and wherever I needed assistance. They gave of themselves willingly.

Crawling, while tired, was not particularly difficult compared to the various rope pitches that I was to encounter. In two locations (the Western Borehole and the Great White Way) I requested a belay over an exposed portion of the crawl/climbs that I had to do. The climbs themselves weren't difficult, but the chance of falling and doing further damage, not to mention severe pain if it happened again, was too much to risk unaided.

Where the Western Borehole starts in the ABCs Room, there is a hand line that had to be negotiated. Fortunately, it was downhill, as most of my vertical gear was back at the Deep Seas Camp where we'd spent the previous night. Using a seat sling I always wore in Lech, I rigged a pair of brake bars on a single biner for enough friction to slide safely down slope. A team member provided bottom belay. The same rig was used again a few hundred feet further along at the Cornflakes Climb. I had intended to use a Munter Hitch at these positions, but Val Hildreth offered the use of her brake bars, which I gladly accepted.

I had started the crawl about 4:00 PM on Sunday and by 10:00 PM that night, we stopped at the first major obstacle,The Great White Way, to bivouac for the night. We were all tired (me especially!) and the thought of tackling that climb that evening was beyond my capabilities. Needless to say, I thought about how I was going to rig an ascent system for the climb for the better part of the early morning hours.

The Great White Way is a steeply sloping pitch (45-60 degrees) with a vertical extent of about 300 feet. Much of it can be managed by scrambling up its gypsum walls, but there are several roped pitches to negotiate. The bottom rope starts with about a 15' free hang which then changes to a 150' sloped climb. Higher up, after the belay I mentioned earlier, are a couple of sloped rope pitches needing further ascending gear.

In normal caving, I use what I consider to be the most versatile climbing system around, the Mitchell System. Using a double roller Gosset Box and a pair of CMI Ascenders with safety lines attached to my seat harness, I can usually tackle nearly any vertical pitch before me. I was glad to have it in this case. Fortunately, I've also practiced and used many other vertical systems in my life and had to tap into that knowledge and skill to get up these ropes as a 1 1/2 legged caver. Knowledge of Frog/Inchworm systems, Texas Prusik and general vertical skills (use of a double tail, safety lines, tyrolean traverse) made it "do-able".

My left leg with its broken ankle was useful only for kneeing my way up, not for climbing with an ascender. As such, I used my lower left

ascender as a seat ascender, with a bungie attached to my chest harness on a shoulder strap and did not run the main rope through the left roller. The right, longer ascender remained as it would in the Mitchell System, running through the right chest roller. I also had my double cow's tail available for attaching to the right ascender.

Since this was an emergency rig, it was obviously not fine tuned for general ascending, but it sure did the trick. There was a fair amount of slop factor in the seat ascender as it was rigged a bit too high and the bungie on top was not tight enough to give a good bite with each step. However, when the rope turned from free hanging to sloped pitch, that bungie was indispensable in terms of allowing the CMI to lay down along the slant of the rope.

The first 15' free climb was accomplished using the seat ascender and the right CMI in the roller. When it became sloped I allowed the seat ascender to lay down along the rope slant, undid the right roller and attached the longer cowls tail to the second hole on bottom of the right CMI, giving me just the right length from seat harness and foot to right ascender. So essentially, I kneeled on my left knee, slid up the right CMI and right foot, stepped on it, then slid up the seat ascender. It was a long, slow climb. This process was repeated several different times wherever roped pitches were encountered.

In several places along the Rift, it was necessary to safely cross over the edges of pits where safety lines were in place for cow's tail clip in. For added safety, I clipped in both cowls tails and added a safety CMI on the side that I was travelling towards. A fall on those lines without an added CMI may have left me stranded at the bottom of the rope apex.

At one point, there is a traverse across the top of a pit that requires quite a straddle with two good legs to accomplish. Needless to say, I couldn't manage it under those circumstances. I rigged it somewhat as a tyrolean traverse, using both cow's tails and a CMI pointing in either direction on opposite sides of me. As this rope isn't normally weighted as a tyrolean, I was a little nervous about its anchors and strength. A failure on either end would still leave me with one point of contact of rope rather than sliding off it to the bottom of the drop 90' below. Of course that failure did not happen and I was able to negotiate it without too much difficulty.

I used a Munter Hitch in a couple more places where short drops were encountered, one or two more belays and somehow managed to get up Boulder Falls in about half an hour or so (a 150' drop). By 5:30, I made the final climb up the 70' entrance pit to a warm New Mexico afternoon.

At about that point, I gave up crawling and gladly accepted a stretcher ride back down to the parking area a mile away. From that time onward, I did everything as logic would prescribe: had a beer, took a shower, went out for dinner, then went to the Emergency Room in Carlsbad. They confirmed that I did indeed break my ankle at the fibula as well as cause radial fracturing of the metatarsal and pulling of ligaments. They did recommend operating on the break to pin it in place, but not until the infection of my hamburgered knees was cleared up a week later. As such, I flew back home to Maine and had it operated on nine days after the injury. I'm pleased to say that it is now virtually totally recovered and I plan on getting back to Lech as soon as time allows.

More than anything, having the knowledge of how various systems work was the key to my getting out on my own. Lechuguilla caving in general really forced me to learn new techniques and improve on old ones to the point where they became nearly second nature. Adaptability was the reason for success. I also feel that it was doubly important under the circumstances to have redundant safety features in my rigging. A slip or failure of any point in the system could have had disastrous consequences, even more so than normally encountered. The fact that all those redundancies were already built into the system made it that much easier to deal with.

I'd like to thank all the participants on the caving trip for their aid in getting me out of there. I'd also like to thank Padgett & Smith for their excellent book, On Rope, which was the basis of my vertical education.

Wheeler's Deep Cave, Nevada

by Ralph E. Powers, NSS# 37616

Utah has some of the finest vertical caves in the country, but it is nice to just jaunt on over to the state line and drop a really nice cave. Such is the case with this one located within Lehman Cave National Monument.

My caving partner, a friend and I had originally planned to freeze our butts off out there camping the night before, but fortunately, all of us being in between paychecks, we couldn't afford that luxury. Not to mention, the area was hit with a good snowstorm that dropped several inches in the area we had planned on being in.

So, finding out that the leader of the trip had plans to meet later that afternoon at the park's visitor's center, the three of us opted to leave early that morning. The 3+ hour drive went as usual and we arrived an hour earlier than the rest of the group and messed around waiting for their impending arrival.

After signing permits to enter the caves, we all drove up to the gate which closed off the park's boundaries during the winter months, parked, ate lunch and made preparations. We then lined up single file for the mile or so hike through 15 inches of freshly fallen snow. It as a lovely hike and we stopped only once to remove our coats as the day was warming up.

We arrived at the ravine and the trip leader, Dale Green of Salt Lake Grotto set about dividing up the group, as he only wanted a few to help him on his survey trip. The rest of us could go and find the other caves that pock-marked the area. One of the other members of our group took the lead, as he had been to the area before. He had a rough idea as to where the caves were, but with the snow and thick brush it wasn't going to be easy to find them.

After poking around a bit, Matt, our new leader, instructed us to wait in one spot while he went on ahead, climbing up the ravine. He was searching for one cave in particular and it took him almost half an hour before he called down to us below. We all then started up, following his trail through the snow. It took a bit of rock climbing and tenaciously slippery foot holds to get up to the top of the ravine. Once there, it was a smooth hike along the edge to the cave entrance.

The entrance is a wide crack in the limestone, about 8 to 10 feet wide and about 15 feet deep, with the floor sloping down to a small hole, which in turn drops into the cave. Because of the snow, we decided that it would be safer to rappel the short drop. Eric, my deaf caving partner (see "A Trip to Candlelight Cave", Nylon HIghway #37), rigged his rope around a mid sized juniper tree and went down the crack first. He then got off rope and prepared himself for the belay.

The crack was wide enough that we could see each other, provided I stood near the edge. As each member of our group prepared to get on rope, I used sign language to let Eric know they were ready to rappel. When they were done, either they or Eric let me know they were off rope. How that would have been done had the crack been deeper or situated where we couldn't see one another would have been difficult.

Once we were all down in the crack, Matt went to the hole in the floor to gauge its accessibility. It is a small, body sized opening which could have been chimneyed, but a couple of us were uncomfortable with the idea and we dropped the rest of the rope down it. There was an old anchor bolt just above the hole and there was a small debate on whether to use it as a rebelay. We decided to use it because we had the original anchor above us.

At the bottom of that little hole, the cave opened into a large room with the floor sloping downwards at a good 50 degree angle. The rope came in handy as a hand line, because the floor was slick in some spots. This continued down for about 50 - 60 feet until it levels off slightly before ending abruptly at a pit.

The actual bottom of the pit could not bee seen, as it too angled down, but at a much steeper angle; nearly 85 to a perfect 90 degrees. Because we could

not ascertain the depth, and had only one 115 foot rope, which was already being used, we sat around discussing our options. Several of us had wanted to do the drop, but other wanted to leave and look for other caves. I had a quick idea and discussed it in sign with Eric before proposing it to the rest of the group.

The idea was that since we wanted to do the drop, but didn't know how deep it was, and only Eric had brought a rope, a couple of us were to free climb back out of the cave and crack, undo the main belay and bring it all down to the pit. Here we could tie it off and thus have (hopefully) enough rope to do the pit. After a discussion and more time consuming debate, we all reached an agreement to go with the plan. Eric and I then climbed back out, which turned out not to be that difficult, undid the anchor and brought the rope down with us to the others.

At the edge of the pit, there was evidence that other cavers had been there before, as one large boulder had two anchors on it and another bolt anchor was placed just above the pit. Due to the apparent age of the bolts, we tested them as best we could and chose the strongest of the two. Through the bolt, we placed a locking carabiner and looped two-inch tubular webbing through that. Another biner was used to connect the webbing to one-inch webbing that we had looped around a smaller boulder closer to the edge of the pit. Figure 1 details the rigging techniques used.

This particular piece of one-inch webbing was too short to go entirely around the bolder twice, as we wanted, though it was over 25 feet long. One of our party had a shorter piece of webbing and we used it to splice the gap. By using water knots on both ends, we had enough. Eric then took three more of his biners and hooked them around the webbing alternating the direction of the gates.

A figure eight on a bight was used at the end of the rope and hooked onto the three biners which were then locked down. About four feet from the boulder and slightly above the edge of the pit was a third anchor bolt. A sixth biner was hooked into that and another figure eight trace was threaded through it thus positioning the rope directly into the pit.

We examined our rigging and it looked sufficient. I felt confident that we had adequate back up should one or more anchors fails. I volunteered to drop the pit first, as I had practiced recently on change-overs should the rope prove too short to reach the bottom. Insuring that all of my climbing gear was with me and within easy reach, I looped the rope through my figure eight descender and prepared to go on down.

It was our intention to determine the depth of the pit so that we would know how much rope to bring next time. Taking it slow and easy, I made it to the bottom in about three minutes. Parts of the descent were free-hanging, but most of it was going over break down and walking on the wall. At the bottom, the floor continued to slop downward, but I kept my descender on the rope just in case. As the floor leveled off to warrant disconnecting the descender, I could see that a good twenty feet of line was still available. I gathered what remaining rope there was and stuffed it in the bag it was attached to and yelled off rope. Mentioning that I was going to poke around a bit to see if it was worth the others to come down.

I did find more passage and a good portion of it was nicely decorated. I had a time limit of ten minutes to explore around because I was the only one down there. With that gone, I reluctantly headed on back up to the rope. Once there, I yelled up to the group and found that one other had decided to brave the pit and come on down. Great! It meant I could explore more of the cave. Matt came down soon enough and I led him to the areas that I had explored.

Twenty minutes later we knew the rest of the group was waiting, so we headed back to the rope. I attached my system onto the rope and Matt provided tension for me as I climbed. I couldn't hurry because the rope had rested on several ledges and I had to work my Jumar over them. I made the climb in about six or seven minutes and greeted the others who were standing around looking cold and impatient. They should have come down with Matt, but...

Matt came up a few minutes later and we set about hauling the rope up. It became a bit of a chore as the rope bag was catching between the ledges. After much dipping and swinging and tugging, we got it up and set about derigging the whole thing. Once everything was together, we proceeded on up and out of the cave.

Since our initial hand line was used as a rappel line, everyone had to free climb back out. At the top of the crack, Eric had tied a figure eight on a bight and sent that end down the to the rest of us to hook into our seat harnesses, since we were still wearing them. Belayed, they felt confident enough to climb up on the snow covered rocks and out of there.

Everyone made it without falling and we started the hike back down the ravine. Once reaching the cave where the other group went, they were still in there surveying, we all decided to just go on back home. The hike back down wasn't bad, just cold as the sun was setting. At the cars, we sorted out various webbing and biners, traded phone numbers and the three of us (Eric, Brian and I) headed home.

Later Brian Flick, who was with us, drew out a sketch of the rigging we had done at the cave. I redrew it and took it to our Grotto meeting. My trainer had studied the drawing and pointed out several areas where we could have done it better. Initially we had over six points of stress, thus giving us six points of failure. Still, for what we had, it was pretty good. We will know next time to lessen the number of connection points and reinforce the ones we have. I'm not saying what we had was the right way to rig this particular drop, but because we were short on webbing and experience, we did the best we could and it all held sufficiently.

FIGURE 1

TRIPLE ANCHOR SYSTEM
WHEELER'S DEEP CAVE, NEVADA

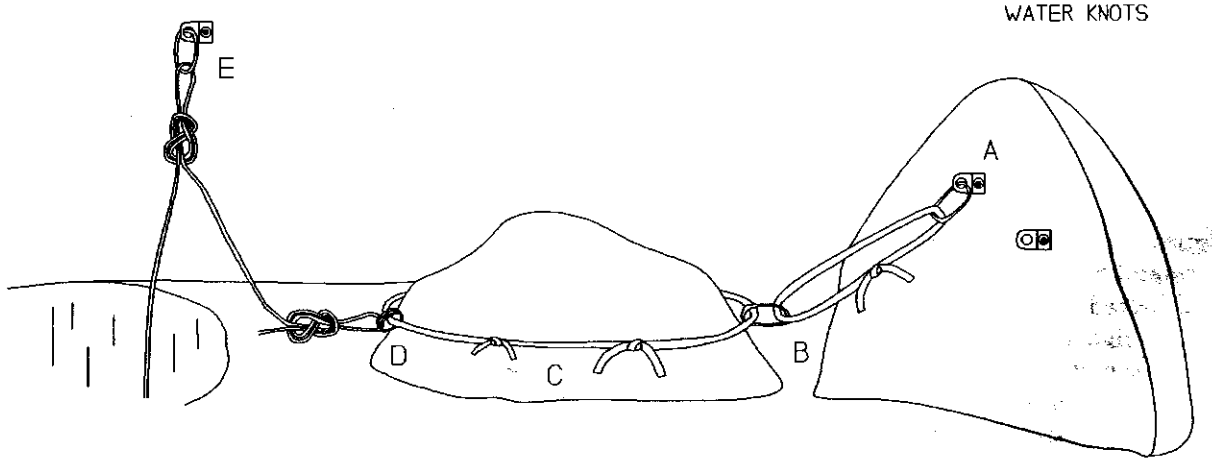
D: BACK-UP ANCHOR POINT
3 LOCKING CARABINERS ALTERNATING DIRECTION OF GATES

E: MAIN BOLT ANCHOR
LOCKING CARABINER
FIGURE EIGHT ON A BIGHT

A: BOLT ANCHORS
LOCKING CARABINER
2" WEBBING

B: LOCKING CARABINER
CONNECTING 2" AND 1"
TUBULAR WEBBING

C: 2 PIECES 1" TUBULAR
WEBBING SPLICED WITH
WATER KNOTS



A View of El Capitan

by Miriam Cuddington

Bill and I were invited as guests to climb El Capitan after the 1993 NSS Convention in Pendleton, Oregon. We cross trained and climbed rope in preparation to ascend the 2650 foot drop. We also thoroughly checked details in our climbing systems for inefficiency and "weak spots".

Driving south in our van from Pendleton, we arrived on Monday afternoon, August 9. It was a beautiful drive with views of the surrounding forest and "big rocks", culminating at the "rock framed" entrance to Yosemite National Park.

Our campsite was already reserved (thanks to Chuck Henson), so we could go right in after admittance by the park ranger at the entrance station. No one was at camp, so we rested and walked around before bedding down for the night. Several people in the group had been to El Cap before, which was very helpful for optimum rigging. The drop had been rigged earlier in the week, so others could climb and rappel before we arrived.

Our group consisted of Jack Hibbard; his son, Brian; Carlos Solar, Robert Volland and Phil Fahey, who were our hosts. Our caving/climbing friends included Chuck Henson, Shannon Cobb, Franklin McKinney and Paul Smith. We also met Ted Farmer, who helped get our rope to the top. We awoke the next morning to find two bodies in sleeping bags and a mini-van sharing our campsite. We were very pleased to meet a few of our friends when they awoke. A call was made on the radio to Jack, who was at the top of the drop, about the progress and daily scheduling. He informed us that our climbing window was around 10:30 a.m.

Naturally, we quickly ate breakfast, drove to El Cap and pulled off on a side road near the cliff face. After changing into our climbing attire and donning our packs of gear, drinks and food, Brian led us to the bottom of the drop. Before we could climb, we waited on Carlos, Chuck, Franklin and Shannon to rappel down. Paul was already at the bottom. We covered our face and arms with "50 proof" sun screen and put on our helmets. The friendly greetings and picture taking made for a great send off. The beautiful weather was an added bonus.

Bill climbed above me with our 8mm video camera and extra gear bag. We used a Petzl jammer/croll double bungie climbing system with a floating safety Gibbs above a Simmons ball bearing roller plate. At times, we used our quick attachment safety to pull on for a variation in muscle use. Paul pulled tension to help me get the "extra"rope stretched out of the system to get off the bottom. We proceeded up the rope with Paul clicking away with his camera.

Apparently, after several hundred feet, the altitude got to me, as I became nauseous and short of breath. We rested quite a bit because of my altitude sickness, otherwise the climb would have been less than the 3.5 hours it took. We drank plenty of fluids during the climb.

The view from the rope was so beautiful! Bill kept videoing the scenery as we climbed. At about 500 feet, we met two rock climbers. Once was from Switzerland and the other from Germany. We exchanged greeting and took pictures of each other before continuing. The wind reminded us of its force by displacing us 30-50 feet side to side, as it wished.

Bill was as happy as a lark. talking the whole time, videoing and encouraging me to do the "El Cap Two Step". Many tourist shuttles with open top roofs stopped on the road below. We would wave just in case binoculars were being used. I felt sure someone saw Bill's brightly striped shirt! The view of the valley below was superb and the trees appeared as mere bushes as we approached the top. We could see Half-dome and other rock formations known to the park most of the way.

Eventually, we made voice contact at the top. It felt great to hear Jack and Carlos and to see the terrain protector on the rope. We worked our way over the edge with the help of a 5:1 haul system and changed over to a shorter rope to go up the top slope to the rigging point.

We decided not to bivouac on top, so radio contact was made for us to be picked up at 9:00 p.m. at Tamarack Flats. Jack and Carlos walked with us the first mile to get more water at the stream. We refilled our bottles and Carlos treated it for us. They then returned to the top base camp. As we continued our beautiful walk out, I felt better and better. We only stopped when necessary. It started to get darker and we began double timing it. I was afraid of bears being attracted to the light, so we agreed not to use one. Two evenings later, our friends encountered a bear and cub on the same trail.

When we smelled campfire, our spirits lifted. We found our place to wait for the ride and rested from our eight mile walk. Brian and Robert arrived about 10 minutes later and drove us back to camp. During our stay, we met three of Ted Farmer's friends at the park. We enjoyed dining and the conversation with them and hope to meet them again.

We enjoyed our trip immensely because our hosts and friends treated us like royalty and with respect. The planning of all details made our trip go very smoothly. Jack prepared a video using our footage with his and others to make one to remember our trip by. He noted at the end that Bill and I are the oldest man-wife team to climb tandem at El Capitan.

A note to anyone planning to do such a long drop: I strongly recommend you use the information in the article, "Preparation and Technique for a Long Rappel" in Nylon Highway #37. It is a very informative and excellent article.

Cam Devices and Prusiks

by Cliff Shattuck

When I first agreed to write this article, I thought it would be easy to propose a position on which was better for rope work - cam devices or prusiks. As I referred to several rescue books and experts in the field as far away as Canada, it became apparent to me that there was a very scientific argument for both sides. I came across people who had spent over a year researching and attempting to prove their position on the argument. My purpose in this article is not to pose as a rescue expert, but to point out some of the pros and cons of both cam devices and prusiks. Hopefully, this will better inform the reader as he/she considers which tool to use.

One big advantage of prusiks is the cost. Prusiks are considerably less expensive than cam hardware and within the budget of most people. Another suggested advantage of the prusik is that it tends to grab more slowly during hauling, putting less stress on the system. Also, prusiks are very light and versatile which makes them appealing to people who carry gear over a distance. Once of the most notable disadvantages of prusiks is their poor performance with wet or muddy ropes. In this type of situation, they can grab unexpectedly or fail to grab when required to. Prusiks are also difficult to utilize and reposition after they have been subjected to a load. Prusiks are often "temperamental" and will start to slip. As a result, they require extra caution and supervision.

The greatest advantage of cam devices is that they are easy to work with after carrying a load. Cam devices do not have the problem of slippage that prusiks do. They also work better on wet or muddy ropes. One disadvantage of cam devices is their expense. Another is they have a reputation of putting more wear and tear on the rope. An important note that needs to be made is that not all cam devices are made for heavy load work. Never use a piece of gear in a manner that it was not designed for.

In the past, cam devices have received a negative reputation for cutting rope when heavy shocks have stressed a system. I would like to mention that there have been reports of prusiks cutting rope. The important thing to remember is that forces that are this demanding should be avoided. All equipment has load limits and points of failure. Load limits need to be carefully adhered to and all equipment should be examined before use.

In conclusion, each tool has its place when we look for solutions to rope problems. Every situations should be evaluated independently before deciding the best and safest equipment to use. The best way to make good decisions is to practice under different circumstances, in different scenarios and with various pieces of equipment.

Beginning Vertical Work

by G.T. Sanford III, NSS 39350

At the 1994 annual convention of the Nature Conservancy in May of this year, a friend of mine and I were privileged to participate in numerous activities sponsored by the Conservancy at Fall Creek Falls State Park near Pikeville Tennessee. Two of the activities that appealed to us were rappelling and caving. The rappel activity was to be limited to 12 people and would involve going down a 40 foot drop. The caving activity would be exploring Indian Cave near Sparta, Tennessee where there are pictoglyphs dating back to the 1400's.

I won't relay all the specifics of those two days except to say that my friend and I fell in love with both activities and decided to actively pursue the acquisition of knowledge and equipment in both areas. Our first stop was at a local sporting goods store where we inquired about rappelling lessons. We were given the name of the local guru whom we would contact later.

While we were at the store, we started looking at the plethora of items available to the rappeller/caver. Wow. Who would have thought that such a large quantity of similar items existed? We were overwhelmed. There was a whole wall covered with just harnesses. Another with figure-eights, carabiners, pulleys and other unidentified hardware. Yet another had helmets, lights and canvas bags. We decided that we didn't know enough about this business to start the learning process. It was kind of like that saying "You can't get there from here". We collected some catalogs and went home to start learning not only what was available, but what it was to be used for. We also bought a most excellent book, "ON ROPE".

"ON ROPE" is published by an organization called the NSS: National Speleological Society. From the book we learned that it was possible to combine our two new-found interests by rappelling into caves! What a concept! We decided that the 90 minute drive to Huntsville, Alabama, to visit this society, was the next order of business. This we did and we found the two ladies there to be very congenial and we joined up on the spot. We also acquired more catalogs (slightly out of date), pamphlets and flyers listing even more things that piqued our interests. We learned of an annual convention by the NSS and that things called "grottos" held local annual conventions and caving events, and that we lived half-way between two of them!

By this time, we had read quite a bit of ON ROPE and had learned some amazing things, such as "going up a rope". Our first encounter with a rope and hardware at Fall Creek Falls had been limited to the use of gravity in going down the rope. Going up the rope was never even mentioned. As we continued reading the book, we realized that there are simply too many variables, too many choices, too many decisions for novices to have to make in light of the seriousness of hanging your life on a small length of nylon.

We finally contacted our instructor and set up a date to go for our first lesson. It would involve multiple rappels down a 90 foot vertical face. I also called a couple of equipment suppliers to get updated catalogs. One of the suppliers told me that during our first class, we should try as many different harnesses and hardware combinations as possible to find out which one suited us best. Aha! Our first clue to solving the correct choice of equipment: find the one that suits us best! We were not quite sure what this meant, since the harnesses we had seen so far have been adjustable, and hardware is designed for a certain purpose; but, we would see what we would see, and we decided to try everything we could.

We have been thinking a lot about getting our own equipment and what we should buy. There is such a large quantity of things available, and each one of those comes in different sizes, compositions and colors. We have been reading everything we could get our hands on about going up and down rope. We have studied hardware specifications and combinations and practical applications and scrutinized drawings and listings and we still don't know what to do. As an example, we decided that we would buy only stainless steel

carabiners. We determined that we wanted the strongest materials available in the hardware we would use, and from all indications, stainless steel was at least twice as strong as aluminum. Even after discovering that stainless steel was more than twice as expensive as aluminum, we still didn't want to settle for second best; more on this later.

The big day of our first class finally arrived. We met at a Waffle House and then drove for about half an hour to the site. It was a man made bluff with caves where there used to be an underground restaurant. From the base of the cliff, we were disappointed that it looked so small. It was a considerable hike to the top of the bluff, following an old cow trail twisting through trees laden with poison ivy. Reaching the top we discover that the place is used so often that there is a permanent rope pad of old carpet attached to the top and side of the site. We get into the basics of knot tying and which knots are appropriate for different applications. We then rig two ropes to a large tree, using a tensionless attachment to eliminate the rope having to turn sharp corners. One rope will be used for descending/ascending and the other will be used as a belay. About 10 feet from the edge, we tie a butterfly knot into the belay line and attach a small rack and ascender. The rack will be used as a belay device with the ascender being used to lock off the belay line should the need arise.

To our dismay there is only one choice of harness to try out, but after using it, we realize that it is the only one we will want to use (having already tried two others at Fall Creek Falls). Now we are ready for the first rappel of the day. Being a short drop, the instructor hands me an aluminum figure 8. It is showing signs of wear from previous drops, and I think I recognize small parts of it that are now being used to add color to the rope. I attach it to the rope, and back down the slight incline to the edge of the drop. I am amazed at how ninety feet can look like so much more from a different perspective. With the instructor guiding me, I lower my rear-end until it is even with my feet and I start my descent. The first drop is as exhilarating as I hoped it would be.

This sport is so much fun. When I reach the bottom and start to release myself from the ropes, I make two observations. The first is that this figure 8 is hot enough to burn bare fingers (thank goodness mine are covered), and the second is that my nice new gloves are now striped with the same color as this hot piece of aluminum. This drop is a little over twice the distance that we dropped at Fall Creek Falls, but I don't remember any heat at all during that descent. This little bugger is HOT. I try to speed up its removal so that the rope doesn't melt. As I leave the base of the drop, I yell "Off Rope" to signal that I am safely away from the rock fall zone so that the belay line can be hauled up and that the next rappeller can start their descent. I ask the instructor about the heat buildup and he assures me that there is nothing to worry about, friction and heat go hand in hand with rappelling devices.

After a few more drops with the figure 8, I switch over to a 6 bar rack. The instructor explains its theory and use and shows me how to adjust the bars to create more and less friction. After attaching it to the rope, I start to back down the incline just as I have been doing all morning. But something is wrong. I am having to use a lot of effort to back up. I realize that the rack is generating a lot more friction than the figure 8, so I try separating the bars to eliminate some of it. I am able to progress a little faster, but I still feel as though I am having to feed the rope into the rack all the way down the drop. With my weight on the rack, it is nearly impossible to move the upper bars, so I resign myself to a slow rappel. (After further reading on the subject, I discovered that most people use spacers between the upper two bars to eliminate the problem I was having.)

It is at this point that I decide I want to try going up the rope. The instructor recommends a rope-walking system with a chest roller. He follows me down the rope and just as he is about to touch bottom, he turns to look at the approaching ground, and gets his hair caught in the rack. Ouch. As I approach him to help, he is standing on his tiptoes trying to relieve the pressure on his hair. I put my weight on the rope which stretches just enough for him to release the rack from his harness and free his hair. He then proceeds to tell me of the hazards of long hair and rappel racks.

I don the rope-walking system, consisting of a left knee harness, a right foot harness, a chest harness with roller, and an ascender connected to my seat harness for safety. It takes a few minutes to get each of the devices attached to the rope, but I finally do and I start to climb. I don't go anywhere. When I lift my foot, the rope comes up with it. The instructor shows me how to pull the

end of the rope up to simulate a weighted rope and I slowly start up. This is work! The first few steps are required to take the stretch out of the rope before I actually start making progress. It takes a little while before I can judge the correct size of step to take so that I am somewhere between too small to make any progress and too large to be able to lift my weight with one leg. The bluff is too close not to pay attention to, and I have to keep one hand on it so that I don't spin around and hit it with my back. Negotiating the lip is rather awkward with the chest roller, but after pulling the pin and releasing it I am able to stand to a crouch and make it over.

I am now completely worn out and ready to call it a day. The numerous rappels, the numerous tenth mile hikes to the top of the bluff, the one rope climb and the ninety-five degree heat have all taken their toll. But I now have some good instruction and practical experience under the belt which will enable me to go further in my education. I am ready to order my own equipment and continue my practice. Deciding which equipment to purchase is not an easy task. There are many points to consider for each item. My first step was to list all these items and the requirements for each.

I find myself tending to overlook the single most important piece of equipment for the rappeller - the rope. Your life will hang by this thread, and when you are backing off a cliff you will question the integrity of the rope, as well as all the rest of the hardware. It is possible to rappel with nothing but a rope, using your body instead of a metal descender. It will not be as comfortable, as convenient, nor nearly as safe as when using hardware, but it can be done. Therefore you must be sure of your rope above all else. I recommend buying a new rope when you start out; refrain from asking your instructor if he would like to sell that old rope he has been carrying around in his trunk for the last hundred years, your life is worth much more. Be sure to buy enough to allow for a belay line, if needed. A good rope is not always your friend, as you will experience if you go down one without proper clothing and gloves. It is important to protect your hands since they are used for guiding and braking. Rope burns are very uncomfortable and can ruin an otherwise wonderful outing. Get you a pair of gloves made for rappelling and wear them.

The second toughest question in equipment selection I had to ponder concerned the selection of a descender. Do I get a figure 8 or a rack? Whichever I choose, do I get aluminum or stainless steel? Here again I found myself very concerned with the strength issue. Stainless steel is my obvious choice, but are there other things to consider? What about wear? When metal starts wearing down, where does the worn away metal go? I remembered the gray stripe on my gloves and answered my own question: it goes on and in the rope. That can't be good for the rope. I decided that I didn't want the wear of one item to adversely affect the life of another, so I went for the rack with stainless steel bars and a stainless steel figure 8. The costs are more now but in the long run will be well worth the extra dollars. I got both types of descenders for a very good reason, for short drops I wanted something that could be attached to the rope very quickly, which the figure 8 can do. For longer drops I wanted something that would allow a greater range of speed control and heat dissipation. A six-bar rack meets this need very well.

Choosing the right harness for you will require some trial by fire. The only way to know if one fits is to try it on, and the only way to get the feel of it is to go down a rope. Most stores don't have any provision for actually trying out their equipment. They also don't want to take back any used equipment. Maybe you'll be lucky and find a great harness the first time like I did. Maybe you'll also be lucky enough to live near the guy that makes the harnesses and can have him do some custom stuff for you.

What was it that my boss once said? Oh yeah, "We don't have problems, just opportunities". Well, just as going down a rope has its own set of "opportunities", going up a rope has its own set too. There are lots of different ascending systems in use today, and deciding which one you will use must be done before you can buy any equipment for it. I liked the rope-walking system that I used on my first course, but I wanted to be sure that there wasn't one better. Above all, an ascending system must be efficient. You don't want to work yourself to death just to gain a few feet of rope. Even with an efficient system, it takes lots of practice to make the overall system efficient since you are adding your body into the equation. You want a system that gives you the most distance from a given amount of effort. The company that I got my harness from also makes a complete line

of components for a rope-walking system. I decided to go ahead and get the whole shooting match from them. It consists of a chest harness with a Simmons roller, a right foot harness with a Gibbs ascender, a left foot harness with a knee-height Gibbs ascender, and a "cow's tail" to prevent heel hang.

Carabiners. Who could have imagined the range of selection available? There are locking and non-locking; aluminum, steel, stainless steel, galvanized, and mixtures of different alloys; oval, rectangular, shaped, and twisted; small, medium and large; and a host of colors. How is the novice supposed to choose the correct ones? I tried asking some salesman and I soon discovered that they tend to recommend what they have in stock, not necessarily what is best for the application. After much thought, deliberation, and research, my friend and I decided to use a stainless steel locking D carabiner as the main attachment point on our harnesses. We would use aluminum ones for all other attachments, and the non-locking aluminum ones would only be used to hold extra equipment to our belts. We would also use stainless steel locking D's in our rope rigging. Should anything go wrong, we didn't want a carabiner to be the weak link in the chain.

Perhaps I have rambled on enough about my beginning experiences with vertical rope work and the decisions that the beginner will be faced with. I urge everyone to investigate the possibilities open to them and judge for themselves the best course to follow. There are many good books and publications available to aid in the journey. One of the best sources of new equipment information that I found was the 1994 PMI Catalog and Equipment Guide. It was free from my local supplier. It has page after page of very useful information.

In a future story, I will tell of my beginning caving experiences. I'm sure you can't wait.

Rope Strength & Care

by Richard Minert

During the early winter of 1992-93, I was reflecting on some discussions I had overheard regarding the age and strength of rope. Conventional wisdom and hearsay gave rise to the conclusion that the 300-foot piece of Type 6 nylon Bluewater 1 rope, which had been so carefully maintained since the summer of 1970, might be too dangerous to use. Peri Frantz, Cindy Heazlit and Derek Hoyle thought it would be a real good idea to have the rope tested. Although I thought I might use the rope without too much hesitation or trepidation, when I questioned others on their willingness to use a rope of that age the most frequent response was, "Hell no!"

Therefore, this article talks about the great contacts I have established, with some truly wonderful people, in the quest to find out how and where the rope could be tested, and some of the things I learned along the way and in final discussion with the tester, as well as about the handling and care of ropes.

I spoke with Cindy Heazlit about whom to contact because she had done such a thorough job of conducting the San Francisco Bay Chapter training sessions on a monthly basis for two years running, and always seemed to have more information on equipment and safety than I could handle at any one time. In addition, I had done some caving with Derek Hoyle, so I also talked with him about whom to contact. Both recommended Bill Bussey, Secretary-Treasurer of the NSS Vertical Section. When I consulted Bill, he recommended that the rope be tested prior to its further use; he also suggested that I give the folks at PMI a call to see if they would volunteer to use their testing facilities. (Special thanks are also due to Bill for his editorial comments.)

PMI, (Pigeon Mountain Industries), was started by a group of cavers from the Tennessee, Alabama, Georgia (TAG) area back in the '70s. Their incentive was to try to perfect static kernmantle rope technology, and provide cavers and others who use rope for vertical work with a superior product. I knew and had caved with one of the guys who started the company, so calling PMI seemed like a logical choice to make. I was referred to PMI's rope chemist, a gentleman by the name of Larry Pickard. Larry said he would be pleased to test the rope, and asked if I could also send a written history of the rope. It seems that they had not seen many pieces of rope of that age in good condition, and had some degree of self interest in conducting the test. I mailed Larry a 25 foot piece, (minimum testing length), along with a one and a half page narrative describing the extent to which the rope had been used, and the care it had received. Two weeks later Larry called me on the telephone and informed me that the rope had tested at an incredible 4,800 lbs! This was a surprise, considering the "new" strength was listed or rated at 6,600 lbs., and that rope is typically rated at half its original strength within two to five years, provided wear is minimal. We discussed the possible causes for the phenomenal test result, the history of the rope, and also some other general points on the care of rope.

One reason that the rope tested so well may have been the material. Type 6 nylon has more elasticity than the low stretch kernmantle ropes now produced by PMI or others. (I recall prusiking years ago some of the big pits in TAG, and getting at least 6 or 8 feet of stretch on drops of over 250 feet with that type of rope.) In testing, they pull the rope slowly between two spools to break it. The rope stretched more, dissipating energy before it broke.

There was also negligible sheath wear on the rope. We always used rope pads to prevent abrasion, and the drops, even those we did in Europe, were mostly free hanging, unlike so many of our drops in California caves. We also did rebelays; and, of course, the obvious bad habits and behavior, like stepping on rope, which can cause sheath and core damage, (thereby reducing rope strength), and stress on personal relationships as well.

I had washed the rope frequently after use. "Woolite" was the favored stuff. The rationale was that if it was effective and soft enough for good wool sweaters, it must be OK for rope. Larry Pickard concurred, but thought that "Woolite" was rather extravagant. After all, there are other products that are "Woolite" mimics, are less costly, and have equally good surfactants that promote removal of dirt particles that cause abrasion and wear of rope fibers. Bill Bussey notes that Downy has been used by Bill Cuddington and others to attempt to keep rope soft. But if you're looking for a tip on less expensive soaps, most of the common dish washing liquids will work well. It is important NOT to use soaps that contain solvents, chlorine bleaches, or detergents that can degrade or chemically affect the nylon. Woolite has none of these, and in addition to nylon safe surfactants, contains a fabric softener which will aid in keeping the rope soft and flexible. It is also important to chain" the rope while it is being washed to prevent twists and kinks.

For reference to chaining technique, refer to "On Rope", by Alan Padgett and Bruce Smith, or Alan Warild's book, "Vertical". (If there is one book I recommend on vertical rope technique, Alan Warild's book is the best. It has more thorough and extensive knot and rigging information. It is inherently more safety conscious. There has been some discussion on this side of the ocean on the book's preference on "European" techniques. All issues of regionalism aside, I recommend that techniques be evaluated on their own merits. You can form your own opinions by purchasing and reading both books.)

It seems like reverse logic that the ropes we use are the most flexible when new, and become stiffer with age. One would think that the continued use of the rope would promote more flexibility with wear. However, the flexibility of a new rope is not attributable to fiber condition, but because the spinning and polymer oils used in the manufacture of the rope wear off or come out as the rope is handled and washed. Since there is no practical way of replacing these oils, the best one can do is either accept stiffer ropes or use a washing product with an effective softener.

Where and how ropes are stored makes a lot of difference in their longevity. Although we frequently toss our ropes into the trunks of our cars, it's not a good idea to leave them there. Fumes from gas and other petroleum products will degrade the nylon. Sulfuric acid residue and fumes

from batteries and battery cables normally stored in or under the trunk will eat nylon rope. In fact, any acid fumes degrade nylon. Garages aren't good places to store ropes because of the potential fumes from petroleum products, paint thinners, detergents, car maintenance products, lawn and garden chemicals, and other chemicals destructive to nylon usually stored there.

This is not to say that the best storage place is your clothes closet, but some place within the house, out of the reach of all of the chemical products mentioned above, would work well.

How do you know if the ropes you're using should be retired? (i.e. used as a halter for bringing in Bessie for milking from the back 40, or as macrame hangers for your favorite house plants.) Some people say that a rope should automatically be retired after 10 years, regardless of its condition. That's obviously not very empirical. A more manifest or apparent guideline is to make the determination based on damage or wear. If a rope is evidently damaged, or has a "soft" spot, that portion should be cut out of the rope. Also, if the rope is worn or damaged so that the core of the rope is exposed at any point, the rope may no longer be strong enough to possess a good margin of safety.

When rope is purchased or cut into different lengths, the methods by which the cuts are made and the rope ends are finished are important. The goals are to obtain a hard, finished end without displacing the position of the sheath relative to its position along the length of the core; and to finish the end without causing fraying at the woven end of the sheath.

There are several ways to do this. One is to heat the sheath along a length of no more than 1/2" to fuse the threads and thereby prevent fraying when the rope is cut. Final finish is obtained by heating the end until all the fibers in the cross section are fused to one another, producing a hard, smooth surface. A second option is to wrap tightly the section intended for cutting with 1" masking tape, compressing the fibers while doing 3 or 4 wraps with the tape. After the rope is cut, the tape is left on while the end is finished the same way as in the method described above. The tape can be left on permanently or removed after the ends are finished.

There are companies that make a plastic coating for finishing rope ends. It is still advisable to heat seal the ends on nylon rope, even with the "whip end dip". This is basically the same stuff that is sold for coating metal tool handles. This material is sold in many distinct colors, and can be used to code ropes by length if you have lots of different ropes of varying lengths.

As a final caution, be careful of the manufacturer from whom you purchase your rope. There are only a few known, reputable manufacturers, such as PMI, SSP, Bluewater, Mamut and Edelrid. If you don't recognize the name of a rope manufacturer from whom you are considering buying rope, check with your fellow cavers to see if they have any experience with the rope. Use only static kernmantle type ropes. This rope is used by the caving community not just for its specific elastic properties, but also for its wear resistance. Laid ropes, (those manufactured with continuous fibers in a wound or spiral pattern), such as the old "Goldline" used before the advent of kernmantle rope technology in the 1960's, are not as wear-resistant, are more elastic, and generally have much lower rated strength. So, you can see that the '60s can legitimately be known for something other than great rock 'n' roll and the founding of a counter-culture.

To conclude, if you handle your ropes properly during use, minimize abrasion by using rope pads and rebelays, wash them before they get too dirty, and store them properly, you'll probably get a lot of use out of your ropes without being too concerned that you're endangering your life and the lives of your fellow cavers. Happy and safe caving!

Letters to the Editor

Dear Editor,

A few key items were omitted from the article I submitted, Belays, Fact or Fable?, printed in Nylon Highway #37. I am writing because these omissions have a direct impact on the contents of the article.

The first omission was in the paragraph covering self belays discussing the use of spelean shunts. It should have read: A pull on the cord or webbing, on the disengaging side of the shunt, gets you going again. Also, in this same paragraph, it states that a person, when rope walking, in on self belay. This is true only if the climber is rigged in such a manner that will prevent a heel hang. A note at the end of this paragraph was left off stating such. A person in a heel hang may not fall any further, but is still in a very serious position.

The next omission was in the paragraph covering auto belays. It should have read, that someone can come up to the rope and pull out the slip knot, instead of up the rope.

I hope this letter helps clarify the article. Since its publication, I have been asked by several people which technique I recommend. As the article stated, no one belay technique is feasible for all circumstances. Also, as far as rescue work is concerned, many of the techniques listed will not catch a two-person load. I suggest that rescue teams conduct tests using realistic weights to see what works, or at least talk with someone who has.

Sincerely,

Mike Payne

Editor's Note: In order to help alleviate the problem of missing text in articles or incorrectly typed or edited articles, a simple solution presents itself. Author's who prepare their articles on computer, as most do nowadays, should send me a disk copy of their work in addition to the hard copy. This not only saves time, but also prevents accidently missing something in the article. Since I toss out the originals when the Nylon Highway is published, I could not look back to the above mentioned article to see if it was an author or editor omission. In either case, I apologize for the confusion this may have caused.

Dear Editor

I was upset to hear that someone needed rescue due to using an old vertical method that was proven bad years ago. The rescue occurred because he used a prusik safety when rappelling a 400+ foot drop. I won't discuss rescuing an uninjured person, but there is something inherently wrong with communications when such a bad method is still used.

I had close friends injured in the early 1960's by using prusik safeties. There were three major problems with them. The user is to pull the knot with him during normal use and let go in emergencies. People in a panic hold tighter, so the concept is horribly flawed. One friend broke both legs when he couldn't let go of the knot. She hit the wall, which knocked her hand loose and when the knot tried to grab, it fused to the rope as she hit bottom.The second problem is that the knots grab at the wrong time, making the user take steps to get the knot loose. The third problem is that the user may be going so fast that the loop is pulled high overhead when it grabs, pulling hands away from the rappel control. Good thing another friend bounced off the wall of Natural Well, away from the landing ledge and onto a knot at the end of the rope.

Another old bone breaker that cavers should be warned against is the single brake bar. I haven't seen this in use in years, but another friend used one in Fern Cave in the '60's and injured her back. She realized the primitive cave rescue situation and climbed out with prusik knots, with the injured back and a broken hand, all from trying to stop on the single brake bar.

We need to warn cavers about accident prone caving methods like the ones mentioned above.

Peter Grant

NSS 5443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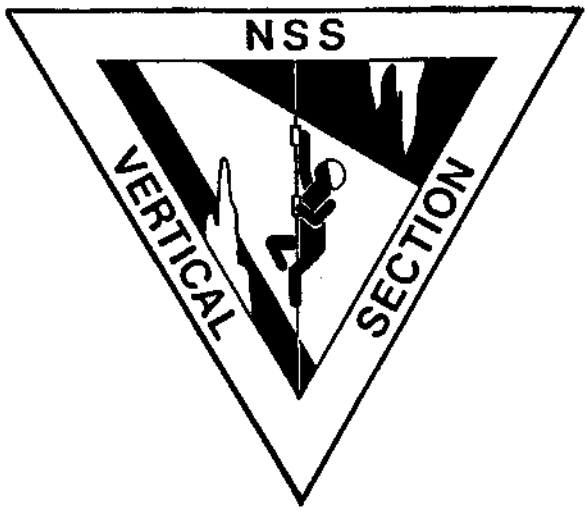

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Olivia Whitwell in Arch Cave, Brittish Columbia. Photograph by Brian Bischoff.

Drawing by Linda Heslop.